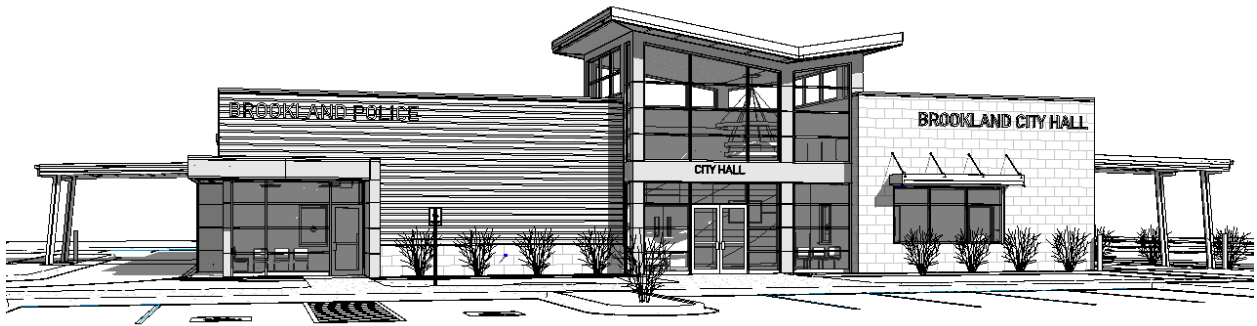




# PROJECT MANUAL



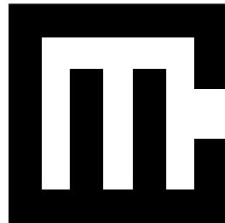
## MUNICIPAL CENTER

### CITY OF BROOKLAND, ARKANSAS

ARCHITECT PROJECT NO. 2224

CONSTRUCTION DOCUMENTS

APRIL 19, 2024



**COOPER MIXON**  
ARCHITECTS

505 UNION STREET, 2<sup>ND</sup> FLOOR  
JONESBORO, AR 72401  
[www.coopermixon.com](http://www.coopermixon.com)

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**SECTION 00 01 05**

**CERTIFICATIONS PAGE**

I hereby certify that the civil portions of these plans and technical specifications have been prepared by me or under my direct supervision and that I am a duly licensed professional engineer under the laws of the state of Arkansas.

John S. Selig, PE

Civil Engineering Associates, LLC.  
2114 East Matthews Avenue  
Jonesboro, AR 72401

DATE: April 19, 2024



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**SECTION 00 01 05**

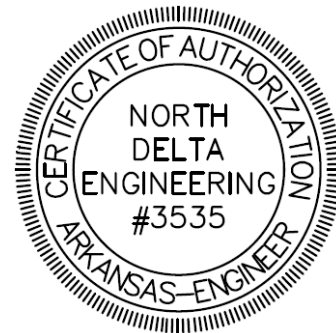
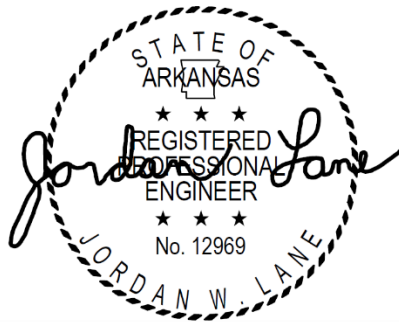
**CERTIFICATIONS PAGE**

I hereby certify that the structural portions of these plans and technical specifications have been prepared by me or under my direct supervision and that I am a duly licensed professional engineer under the laws of the state of Arkansas. I certify that to the best of my knowledge the structural portions of the plans and specifications are designed as required by law and in compliance with all applicable codes for the state of Arkansas.

Jordan Lane, PE

NORTH DELTA ENGINEERING  
1914 E. Matthews Avenue  
Jonesboro, AR 72401

DATE: April 19, 2024



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**SECTION 00 01 05**

**CERTIFICATIONS PAGE**

I hereby certify that these plans and specifications have been prepared by me or under my supervision. I further certify that to the best of my knowledge these plans and specifications are as required by law and in compliance with the Arkansas Fire Prevention Code for the state of Arkansas.

John Mixon, Architect



COOPER MIXON ARCHITECTS PLLC  
505 Union Street, 2<sup>nd</sup> Floor  
Jonesboro, Arkansas 724 01

DATE: April 19, 2024

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**SECTION 00 01 05**

**CERTIFICATIONS PAGE**

I hereby certify that the mechanical and plumbing portions of these plans and technical specifications have been prepared by me or under my direct supervision and that I am a duly licensed professional engineer under the laws of the state of Arkansas.

D. Wes Collier, PE

DW COLLIER ENGINEERING, INC.  
720 Broadway Street  
Suite 100  
South Fulton, TN 38257

DATE: April 19, 2024



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**END OF SECTION**

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**SECTION 00 11 13  
ADVERTISEMENT FOR BIDS**

**FROM:**

**1.01 THE OWNER (HEREINAFTER REFERRED TO AS OWNER):**

- A. City of Brookland
- B. Address:
  - County Road 760
  - Brookland, Arkansas 72417

**1.02 AND THE ARCHITECT (HEREINAFTER REFERRED TO AS ARCHITECT):**

- A. Cooper Mixon Architects, PLLC
  - 1. Address: 505 Union Street, 2nd Floor, Jonesboro, Arkansas 72401.

**1.03 TO: POTENTIAL BIDDERS**

- A. Your firm is invited to submit an offer under seal to Owner for construction of a facility located at:
    - County Road 760
    - Brookland, Arkansas 72417Before 2:00 pm local standard time on the 28th day of May, 2024, for:
    - 1. Project: Brookland Municipal Center.
  - B. Bids can be dropped off at the Brookland City Hall up until 4:00 p.m., at a date and address listed above.
  - C. Architect's Project Number: 2224
  - D. Owner's Contract Number: To be determined
  - E. Project Description: The project consists of the new Municipal Center for the City of Brookland, Arkansas and associated site improvements.
  - F. Bidders will be required to provide Bid security in the form of a Bid Bond of a sum no less than 5 percent of the Bid Amount. Proposals shall be accompanied by a cashier's or certified check upon a national or state bank in an amount not less than five percent (5%) of the total maximum bid price payable without recourse to the City of Brookland or a Bid Bond in the same amount from a reliable surety company, as a guarantee that bidder will enter into a contract and execute Performance and Payment Bonds within ten (10) days after Notice of Award of Contract. The Notice of Award of Contract shall be given by the Owner within Sixty (60) days following the opening of bids.
  - G. The successful bidder must furnish a Performance and Payment Bond upon the form provided in the amount of one hundred percent (100%) of the contract price from an approved surety company holding a permit from the State of Arkansas to act as surety, or other surety or sureties acceptable to the Owner.
  - H. Bid Documents for a Stipulated Sum contract may be obtained from the office of Jonesboro Blueprint and Supply, 222 Madison Street, Jonesboro, AR 72401 upon receipt of a refundable deposit, by cash or check (payable to Cooper Mixon Architects PLLC) in the amount of \$150.00 for one set.
  - I. Documents may be obtained only by Bidders. Others may view the Bid Documents at the office of the Owner.
  - J. Refer to other bidding requirements described in Document 00 21 13 - Instructions to Bidders and Document 00 31 00 - Available Project Information.
-

- K. Submit your offer on the Bid Form provided. Bidders may supplement this form as appropriate.
- L. Proposals will be considered on the basis of cost. The City of Brookland reserves the right to reject any or all bids, to waive any informalities, and to accept the proposal deemed to be for their best interest.
- M. Your offer will be required to be submitted under a condition of irrevocability for a period of 60 days after submission.
- N. The City of Brookland hereby notifies all bidders that this Contract is subject to applicable Labor Laws, Non-Discrimination Provisions, Wage Rate Laws and other Federal Laws, including the Fair Labor Standards Acts of 1938. The Work Hours Act of 1962 and Title VI of the Civil Rights Act of 1964 also apply.
- O. The City of Brookland encourages participation of small, minority, and woman owned business enterprises in the procurement of goods, services, and construction, either as a general contractor or a subcontractor. It is further requested that whenever possible, majority contractors who require subcontractors, seek qualified small, minority, and women owned businesses to partner with them.

**END OF SECTION**

**SECTION 00 21 13  
INSTRUCTIONS TO BIDDERS**

**SUMMARY**

**1.01 SEE AIA A701, INSTRUCTIONS TO BIDDERS FOLLOWING THIS DOCUMENT.**

**END OF SECTION**

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# AIA® Document A701® – 2018

## Instructions to Bidders

for the following Project:  
*(Name, location, and detailed description)*

Brookland Municipal Center  
Brookland, Arkansas  
The project consists of the new construction of a Municipal Center for the City of Brookland, Arkansas.

**THE OWNER:**  
*(Name, legal status, address, and other information)*

City of Brookland, Arkansas, Other  
613 Holman  
Brookland, AR 72417  
Telephone Number: (870) 931-6221

**THE ARCHITECT:**  
*(Name, legal status, address, and other information)*

Cooper Mixon Architects PLLC, Professional Limited Liability Company  
505 Union Street  
2nd Floor  
Telephone Number: (870) 336-0536

### TABLE OF ARTICLES

- 1     **DEFINITIONS**
- 2     **BIDDER’S REPRESENTATIONS**
- 3     **BIDDING DOCUMENTS**
- 4     **BIDDING PROCEDURES**
- 5     **CONSIDERATION OF BIDS**
- 6     **POST-BID INFORMATION**
- 7     **PERFORMANCE BOND AND PAYMENT BOND**
- 8     **ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS**

**ADDITIONS AND DELETIONS:**  
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

**FEDERAL, STATE, AND LOCAL LAWS MAY IMPOSE REQUIREMENTS ON PUBLIC PROCUREMENT CONTRACTS. CONSULT LOCAL AUTHORITIES OR AN ATTORNEY TO VERIFY REQUIREMENTS APPLICABLE TO THIS PROCUREMENT BEFORE COMPLETING THIS FORM.**

It is intended that AIA Document G612™–2017, Owner’s Instructions to the Architect, Parts A and B will be completed prior to using this document.

## ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the Proposed Contract Documents. The Bidding Requirements consist of the advertisement or invitation to bid, Instructions to Bidders, supplementary instructions to bidders, the bid form, and any other bidding forms. The Proposed Contract Documents consist of the unexecuted form of Agreement between the Owner and Contractor and that Agreement's Exhibits, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda, and all other documents enumerated in Article 8 of these Instructions.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, or in other Proposed Contract Documents apply to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect, which, by additions, deletions, clarifications, or corrections, modify or interpret the Bidding Documents.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents, to which Work may be added or deleted by sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from, or that does not change, the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment, or labor for a portion of the Work.

## ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 By submitting a Bid, the Bidder represents that:

- .1 the Bidder has read and understands the Bidding Documents;
- .2 the Bidder understands how the Bidding Documents relate to other portions of the Project, if any, being bid concurrently or presently under construction;
- .3 the Bid complies with the Bidding Documents;
- .4 the Bidder has visited the site, become familiar with local conditions under which the Work is to be performed, and has correlated the Bidder's observations with the requirements of the Proposed Contract Documents;
- .5 the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception; and
- .6 the Bidder has read and understands the provisions for liquidated damages, if any, set forth in the form of Agreement between the Owner and Contractor.

## ARTICLE 3 BIDDING DOCUMENTS

### § 3.1 Distribution

§ 3.1.1 Bidders shall obtain complete Bidding Documents, as indicated below, from the issuing office designated in the advertisement or invitation to bid, for the deposit sum, if any, stated therein.

*(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall obtain Bidding Documents.)*

Jonesboro Blueprint and Supply  
222 Madison Street  
Jonesboro, AR 72401

(870) 932-4349

Southern Reprographics  
901 West 7<sup>th</sup> Street  
Little Rock, AR 72201  
(501) 372-4011

§ 3.1.2 Any required deposit shall be refunded to Bidders who submit a bona fide Bid and return the paper Bidding Documents in good condition within ten days after receipt of Bids. The cost to replace missing or damaged paper documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the paper Bidding Documents, and the Bidder's deposit will be refunded.

§ 3.1.3 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the advertisement or invitation to bid, or in supplementary instructions to bidders.

§ 3.1.4 Bidders shall use complete Bidding Documents in preparing Bids. Neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete Bidding Documents.

§ 3.1.5 The Bidding Documents will be available for the sole purpose of obtaining Bids on the Work. No license or grant of use is conferred by distribution of the Bidding Documents.

### § 3.2 Modification or Interpretation of Bidding Documents

§ 3.2.1 The Bidder shall carefully study the Bidding Documents, shall examine the site and local conditions, and shall notify the Architect of errors, inconsistencies, or ambiguities discovered and request clarification or interpretation pursuant to Section 3.2.2.

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing and shall be received by the Architect at least seven days prior to the date for receipt of Bids.  
*(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall submit requests for clarification and interpretation.)*

Send email to:  
Oz Garcia  
Cooper Mixon Architects PLLC  
[ogarcia@coopermixon.com](mailto:ogarcia@coopermixon.com)  
Cc: [jmixon@coopermixon.com](mailto:jmixon@coopermixon.com)

§ 3.2.3 Modifications and interpretations of the Bidding Documents shall be made by Addendum. Modifications and interpretations of the Bidding Documents made in any other manner shall not be binding, and Bidders shall not rely upon them.

### § 3.3 Substitutions

§ 3.3.1 The materials, products, and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.

#### § 3.3.2 Substitution Process

§ 3.3.2.1 Written requests for substitutions shall be received by the Architect at least ten days prior to the date for receipt of Bids. Requests shall be submitted in the same manner as that established for submitting clarifications and interpretations in Section 3.2.2.

§ 3.3.2.2 Bidders shall submit substitution requests on a Substitution Request Form if one is provided in the Bidding Documents.

§ 3.3.2.3 If a Substitution Request Form is not provided, requests shall include (1) the name of the material or equipment specified in the Bidding Documents; (2) the reason for the requested substitution; (3) a complete description of the proposed substitution including the name of the material or equipment proposed as the substitute, performance and test

data, and relevant drawings; and (4) any other information necessary for an evaluation. The request shall include a statement setting forth changes in other materials, equipment, or other portions of the Work, including changes in the work of other contracts or the impact on any Project Certifications (such as LEED), that will result from incorporation of the proposed substitution.

§ 3.3.3 The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.4 If the Architect approves a proposed substitution prior to receipt of Bids, such approval shall be set forth in an Addendum. Approvals made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3.5 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

#### § 3.4 Addenda

§ 3.4.1 Addenda will be transmitted to Bidders known by the issuing office to have received complete Bidding Documents.

*(Indicate how, such as by email, website, host site/platform, paper copy, or other method Addenda will be transmitted.)*

§ 3.4.2 Addenda will be available where Bidding Documents are on file.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids, except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Prior to submitting a Bid, each Bidder shall ascertain that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

### ARTICLE 4 BIDDING PROCEDURES

#### § 4.1 Preparation of Bids

§ 4.1.1 Bids shall be submitted on the forms included with or identified in the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed. Paper bid forms shall be executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and numbers, unless noted otherwise on the bid form. In case of discrepancy, the amount entered in words shall govern.

§ 4.1.4 Edits to entries made on paper bid forms must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change" or as required by the bid form.

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall neither make additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name and legal status of the Bidder. As part of the documentation submitted with the Bid, the Bidder shall provide evidence of its legal authority to perform the Work in the jurisdiction where the Project is located. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further name the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached, certifying the agent's authority to bind the Bidder.

§ 4.1.8 A Bidder shall incur all costs associated with the preparation of its Bid.



## **§ 4.2 Bid Security**

**§ 4.2.1** Each Bid shall be accompanied by the following bid security:

*(Insert the form and amount of bid security.)*

Cashier's or Certified Check upon a national or state bank in an amount not less than five percent (5%) of the total maximum bid price payable without recourse to the City of Jonesboro or a Bid Bond in the same amount from a reliable surety company.

**§ 4.2.2** The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and shall, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. In the event the Owner fails to comply with Section 6.2, the amount of the bid security shall not be forfeited to the Owner.

**§ 4.2.3** If a surety bond is required as bid security, it shall be written on AIA Document A310™, Bid Bond, unless otherwise provided in the Bidding Documents. The attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of an acceptable power of attorney. The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

**§ 4.2.4** The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until (a) the Contract has been executed and bonds, if required, have been furnished; (b) the specified time has elapsed so that Bids may be withdrawn; or (c) all Bids have been rejected. However, if no Contract has been awarded or a Bidder has not been notified of the acceptance of its Bid, a Bidder may, beginning 60 days after the opening of Bids, withdraw its Bid and request the return of its bid security.

## **§ 4.3 Submission of Bids**

**§ 4.3.1** A Bidder shall submit its Bid as indicated below:

*(Indicate how, such as by website, host site/platform, paper copy, or other method Bidders shall submit their Bid.)*

Paper copy

**§ 4.3.2** Paper copies of the Bid, the bid security, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope with Bidder's name and address in the upper left-hand corner of the envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address, and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

**§ 4.3.3** Bids shall be submitted by the date and time and at the place indicated in the invitation to bid. Bids submitted after the date and time for receipt of Bids, or at an incorrect place, will not be accepted.

**§ 4.3.4** The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

**§ 4.3.5** A Bid submitted by any method other than as provided in this Section 4.3 will not be accepted.

## **§ 4.4 Modification or Withdrawal of Bid**

**§ 4.4.1** Prior to the date and time designated for receipt of Bids, a Bidder may submit a new Bid to replace a Bid previously submitted, or withdraw its Bid entirely, by notice to the party designated to receive the Bids. Such notice shall be received and duly recorded by the receiving party on or before the date and time set for receipt of Bids. The receiving party shall verify that replaced or withdrawn Bids are removed from the other submitted Bids and not considered. Notice of submission of a replacement Bid or withdrawal of a Bid shall be worded so as not to reveal the amount of the original Bid.

**§ 4.4.2** Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids in the same format as that established in Section 4.3, provided they fully conform with these Instructions to Bidders. Bid security shall be in an amount sufficient for the Bid as resubmitted.

**§ 4.4.3** After the date and time designated for receipt of Bids, a Bidder who discovers that it made a clerical error in its Bid shall notify the Architect of such error within two days, or pursuant to a timeframe specified by the law of the jurisdiction where the Project is located, requesting withdrawal of its Bid. Upon providing evidence of such error to the reasonable satisfaction of the Architect, the Bid shall be withdrawn and not resubmitted. If a Bid is withdrawn pursuant to this Section 4.4.3, the bid security will be attended to as follows:

*(State the terms and conditions, such as Bid rank, for returning or retaining the bid security.)*

All bid guarantees not forfeited under the terms of the bidding, except for the two lowest responsible bidders, shall be returned on or before the sixth day subsequent to the bid opening. If the contract is not awarded, the bid guarantees of the two lowest responsible bidders should be returned within sixty (60) days subsequent to the bid opening, unless an extension is granted by those bidders.

## **ARTICLE 5 CONSIDERATION OF BIDS**

### **§ 5.1 Opening of Bids**

If stipulated in an advertisement or invitation to bid, or when otherwise required by law, Bids properly identified and received within the specified time limits will be publicly opened and read aloud. A summary of the Bids may be made available to Bidders.

### **§ 5.2 Rejection of Bids**

Unless otherwise prohibited by law, the Owner shall have the right to reject any or all Bids. The Owner reserves the right to consider as unqualified to do the work any Bidder who does not habitually perform with his own forces the major portion of such work as is involved in construction of these improvements.

### **§ 5.3 Acceptance of Bid (Award)**

**§ 5.3.1** It is the intent of the Owner to award a Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents. Unless otherwise prohibited by law, the Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests.

**§ 5.3.1.1** Liquidated damages, if specified, have no value when determining the lowest responsive and responsible Bidder.

**§ 5.3.2** Unless otherwise prohibited by law, the Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the lowest responsive and responsible Bidder on the basis of the sum of the Base Bid and Alternates accepted.

## **ARTICLE 6 POST-BID INFORMATION**

### **§ 6.1 Contractor's Qualification Statement**

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request and within the timeframe specified by the Architect, a properly executed AIA Document A305™, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for this Bid.

**§ 6.1.1** The successful Bidder, if a corporation created under the laws of a state other than the State of Arkansas, will be required to qualify, or to have qualified, with the Secretary of State of Arkansas to do business in the State of Arkansas.

### **§ 6.2 Owner's Financial Capability**

A Bidder to whom award of a Contract is under consideration may request in writing, fourteen days prior to the expiration of the time for withdrawal of Bids, that the Owner furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. The Owner shall then furnish such reasonable evidence to the Bidder no later than seven days prior to the expiration of the time for withdrawal of Bids. Unless such reasonable evidence is furnished within the allotted time, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

### **§ 6.3 Submittals**

**§ 6.3.1** After notification of selection for the award of the Contract, the Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, submit in writing to the Owner through the Architect:

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and

- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, withdraw the Bid or submit an acceptable substitute person or entity. The Bidder may also submit any required adjustment in the Base Bid or Alternate Bid to account for the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

## ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

### § 7.1 Bond Requirements

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 7.1.3.1 Attention of Bidders is called to Act 82 of the 1935 Acts of the Arkansas General Assembly, which has certain requirements pertaining to performance bonds, labor bonds, employer's liability insurance, public liability insurance, workmen's collective insurance, and property damage insurance.

§ 7.1.3.2 All companies furnishing bid bonds and performance bonds shall furnish evidence of being on the U.S. Treasury Department's most current list (Circular 570, as amended) and be authorized to transact business in the State of Arkansas.

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.

*(If Payment or Performance Bonds are to be in an amount other than 100% of the Contract Sum, indicate the dollar amount or percentage of the Contract Sum.)*

100% of the Contract Sum.

### § 7.2 Time of Delivery and Form of Bonds

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to commence sooner in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bond a certified and current copy of the power of attorney.

**ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS**

**§ 8.1** Copies of the proposed Contract Documents have been made available to the Bidder and consist of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.  
*(Insert the complete AIA Document number, including year, and Document title.)*

AIA Document A101™–2017 Standard Form of Agreement Between Owner and Contractor

- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds, unless otherwise stated below.  
*(Insert the complete AIA Document number, including year, and Document title.)*

AIA Document A101™–2017, Exhibit A, Insurance and Bonds

- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction, unless otherwise stated below.  
*(Insert the complete AIA Document number, including year, and Document title.)*

*(Paragraphs deleted)*

AIA Document A201™–2017, General Conditions of the Contract for Construction

- .5 Drawings: Listed in the Project Manual

*(Table deleted)*

- .6 Specifications: Listed in the Project Manual

*(Table deleted)*

- .7 Addenda: Listed in the Project Manual

*(Table deleted)*

- .8 Other Exhibits:  
*(Check all boxes that apply and include appropriate information identifying the exhibit where required.)*

AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:  
*(Insert the date of the E204-2017.)*

Not Applicable

The Sustainability Plan:

Title	Date	Pages
-------	------	-------

<input checked="" type="checkbox"/>	Supplementary and other Conditions of the Contract: Listed in the Project Manual	
-------------------------------------	--	--

*(Table deleted)*

- .9 Other documents listed below:  
*(List here any additional documents that are intended to form part of the Proposed Contract Documents.)*

1. Advertisement for Bids
2. Contractor’s Bid and Bid Bond
3. Certified Bid Tabulation
4. Certificate(s) of Insurance
5. Payment and Performance Bonds (filed/recorded in Craighead County)
6. Contractor’s Affidavit of Payment of Debts and Claims (required at close-out)

7. Contractor's Release of Liens (required at close-out)
8. Consent of Surety of Final Payment (required at close-out)



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**SECTION 00 31 00  
AVAILABLE PROJECT INFORMATION**

**PART 1 GENERAL**

**1.01 EXISTING CONDITIONS**

- A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders but will not be part of Contract Documents, as follows:
- B. Geotechnical Report: Entitled Proposed Brookland City Hall and Police Department, dated July 17, 2023.
  - 1. Prepared by [ Anderson Engineering Consultants, Inc.], Little Rock and Jonesboro, Arkansas.
  - 2. For Contractor's convenience a copy is included following end of this Section.
  - 3. This report identifies properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of Architect.
  - 4. The recommendations described shall not be construed as a requirement of this Contract, unless specifically referenced in Contract Documents.
  - 5. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Sum accruing to Owner.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

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**ANDERSON ENGINEERING CONSULTANTS, INC.**

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AECI.JONESBORO@GMAIL.COM

**PROPOSED BROOKLAND CITY HALL AND POLICE DEPARTMENT  
BROOKLAND, ARKANSAS**

\* \* \* \* \*

**CIVIL ENGINEERING ASSOCIATES, LLC  
CIVIL ENGINEERS  
1500 EAST WASHINGTON AVENUE, SUITE C  
JONESBORO, ARKANSAS 72401**

\* \* \* \* \*

**JULY 17, 2023  
JOB NO. 17332**





# ANDERSON ENGINEERING CONSULTANTS, INC.

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July 17, 2023

Job No. 17332

Mr. John Selig, P.E.  
Civil Engineering Associates, LLC  
1500 East Washington Avenue, Suite C  
Jonesboro, Arkansas 72401

Email: [jselig@ce-associates.biz](mailto:jselig@ce-associates.biz)

Re: Geotechnical Investigation  
Proposed Brookland City Hill and Police Department  
Brookland, Arkansas

Dear Mr. Selig:

It is our pleasure to submit this report on the soil and foundation investigation for the proposed Brookland City Hall and Police Department in Brookland, Arkansas. The investigation consisted of field test borings, soils laboratory analyses, pavement analyses, and foundation design analyses.

We recommend that the site preparation and foundation excavations be verified by a qualified geotechnical representative during the foundation construction, so that adequate remedial measures can be implemented. This is the most feasible means of assuring the owners, designers, and builders that the geotechnical design intent is being achieved. In the event adverse geotechnical conditions are encountered during excavation, they must be identified and evaluated so that safe and economical structures may be constructed.

We wish to express our appreciation for the opportunity of serving you and other members of the design team. We are available for further consultation during the design and construction at any time, should you have a need for further assistance.

Very truly yours,

ANDERSON ENGINEERING CONSULTANTS, INC.



Stuart M. Scheiderer, R.E.P., P.E.  
Senior Geotechnical Engineer

Scott W. Anderson, R.E.P., P.E.  
Principal Engineer



SMS/SWA/ilb  
17332.GEO

GEOTECHNICAL INVESTIGATION  
FOR  
PROPOSED BROOKLAND CITY HALL AND POLICE DEPARTMENT  
BROOKLAND, ARKANSAS

\* \* \* \* \*

CIVIL ENGINEERING ASSOCIATES, LLC  
CIVIL ENGINEERS  
1500 EAST WASHINGTON AVENUE, SUITE C  
JONESBORO, ARKANSAS 72401

\* \* \* \* \*

BY  
ANDERSON ENGINEERING CONSULTANTS, INC.  
GEOTECHNICAL CONSULTANTS  
10205 ROCKWOOD ROAD  
LITTLE ROCK, ARKANSAS 72204

JULY 17, 2023

JOB NO. 17332

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## **PURPOSE**

The primary purposes of this geotechnical investigation were:

- a. To determine the physical and engineering properties of the soils within the area of the proposed construction with respect to their suitability for the support of the proposed facility.
- b. To make recommendations for the earthwork, pavements, and the type of foundation suited for the prevailing soil conditions within the proposed construction area.
- c. To evaluate and recommend the design procedures for the various soil, pavement, and foundation items in accordance with current engineering practices.

## **SCOPE**

The scope of this geotechnical investigation includes the following:

- a. The geologic features of the job site area consist of alluvial silts and clays from Quaternary aged Terrace deposits. The site stratigraphy was defined by six auger borings terminated at depths ranging from 11.5 to 26.5 feet as authorized by the client.
- b. Field testing consisted of Standard Penetration test samples (ASTM D 1586) taken in all of the borings. Soils were visually classified in the field by a soils engineering technician.
- c. The soils analyses were based on N-values obtained from the Standard Penetration tests, Atterberg limits, mechanical grain size analyses, visual observations, and other routine inspection and classification methods. The soils were classified basically in accordance with the Unified Soil Classification System (ASTM D 2487); however, visual classifications may be given on the logs.
- d. The foundation bearing capacity and settlement analyses were based on our current foundation design procedures, using the Standard Penetration N-values obtained during drilling, results of the laboratory testing program, and engineering analyses.
- e. The flexible and rigid pavement designs shown in this report are based on the CBR design method estimated from field and laboratory tests on the near surface soils encountered across the site.

## **AUTHORITY**

This geotechnical investigation was authorized by acceptance of AECI Proposal No. 23111 on May 24, 2023, by Mr. John Selig, P.E., of Civil Engineering Associates, LLC, the contractor and owner's representative for the proposed project.

## **PROJECT DESCRIPTION**

The site of the proposed project is located on the south side of Brookland School Road W, just west of its intersection with County Road 741 in Brookland, Arkansas, as shown on the Vicinity Map, Plate 1. The project will consist of a new building with an approximate footprint of 7500 square feet. The building will be located near the middle of the site and surrounded by parking/drives. Though existing and proposed grades were not provided, varying amounts of cut/fill are anticipated to obtain proposed grades. The site was covered with moderate to thick vegetation. Loads are anticipated to be light.

## **GENERAL GEOLOGY**

The 1993 Geologic Map of Arkansas as prepared by the Arkansas Geologic Commission and the United States Geologic Survey indicate that the proposed site is located in the Mississippi Embayment Physiographic Region of east Arkansas and is underlain by Quaternary aged Terrace Deposits. The Stratigraphic Summary of Arkansas, also published by the Arkansas Geologic Commission, indicates that the terrace deposits include complex sequences of unconsolidated gravels, sandy gravels, sands, silty sands, silts, clayey silts, and clays. The individual deposits are often lenticular and discontinuous. At least three terrace levels are recognized with the lowest being the youngest.

## **GEOTECHNICAL INVESTIGATION**

On June 25, 2023, a geotechnical drilling crew performed the drilling and sampling of six borings at the proposed project site as shown on the Plan of Borings, Plate 2. As a result of the drilling program, boring logs showing stratigraphic and testing information are provided on Plates 3 through 8. The Field Classification System for Soil Exploration and Key to the Soil Classifications and Symbols are given on Plates 9 and 10, respectively. These systems are provided to aid the reader in interpreting the various symbols used on the logs of borings. The Unified Soil Classification System is given on Plate 11. This system is used to determine the soil classification and to develop the terminology used on the logs of borings.

The N-values shown on the logs and were determined from the number of blows (N) of the 140.0-pound hammer required to drive the 1-3/8-inch I.D. split spoon the last 12.0 inches of the total 18.0-inch drive or portions thereof as may be indicated on the boring logs. These values are used to correlate strength and settlement characteristics of the soils and to determine allowable bearing values of these materials. A value greater than 50 blows per foot is considered refusal. The soil samples obtained from the borings were visually classified in the field by an engineering technician.

## **GROUNDWATER CONDITIONS**

Groundwater was encountered at a depth of 20.0 feet during the field investigation in one boring. While the long term static water level is seasonal in nature and will rise and fall with fluctuations in rainfall and seasonal agricultural pumping, it is likely beyond the extent of construction. However, a high perched groundwater table should be expected in the near surface soils and should be accounted for in the design and construction of foundations, utilities, and equipment pits. Temporary dewatering of the excavation by sump/pump may be required. Perched water is a latent water condition typically caused by storage of recent rainfall or retention by a barrier to capillary evaporation. Perched water is often brief in duration and typically in low quantities. However, larger storage volumes may be encountered at the site in the lower plasticity clays encountered.

Areas likely to contain perched water include old drainage swales, around existing foundations/slabs/pavements, existing utility trenches, in fill areas, and beneath trees. Where groundwater or perched water is encountered the contractor should expect to excavate gravity drainage ditches to divert it away from the construction area. Additionally, soft, wet and pumpable soils can be expected. In structural areas, these soils should be removed and replaced with a select fill soil compacted in accordance with criteria provided in the **EARTHWORK** section of this report. Since the quantity of undercut is unknown, it would be prudent to establish a unit rate for this item of work to minimize construction delays.

## **SITE DRAINAGE**

The owner, designers, and contractors should also consider the topography of the site and surrounding areas during planning, design, and construction. The final grading should ensure positive drainage away from the building and pavements. It is strongly recommended that roof drains, condensate lines, and other potential water sources divert water away from the buildings, preferably to the storm sewer system, to prevent accumulation around the perimeter of the proposed structures. The subgrade soils have the ability of absorbing significant amounts of moisture, which could be detrimental as strength loss which will typically result with increases in moisture content.

Consideration should be given to control of surface water runoff during construction. Saturation of the in-situ soils will contribute to increased earthwork in the form of undercut and backfill replacement, especially during wet or winter weather. Improving the site drainage during the early stages of construction should improve site conditions during earthwork. The owner, designers, and contractors should consider maintaining the existing drainage features and incorporating them into the overall site drainage to improve the surface conditions in an effort to prevent water from

ponding within the structural, pavement, and landscaped areas. Gravity drainage ditches may also be developed on the southern and western sides of the site to further tie the drainage to the existing ditches.

### **SEISMICITY**

The seismic analysis requires the selection of appropriate site coefficients and other seismic values that can be established from the subsurface conditions, guidelines set forth by local, state, and federal codes, and historical seismic information. The structure should be designed using guidelines as set forth in the 2015 International Building Code as required by **Arkansas Act 1100-1991** (and subsequent amendments) as determined appropriate. The site soils consist primarily of clay (CL or CL/CH), from Quaternary aged Terrace Deposits. The following seismic values were obtained from the U.S. Geological Seismic Design Maps application and are considered applicable to this project site based upon the site conditions and the 2015 International Building Code (IBC) seismic values for Arkansas:

Site Class . . . . .	D
Value of Site Coefficient ( $F_a$ ) . . . . .	1.0
Value of Site Coefficient ( $F_v$ ) . . . . .	1.5
Spectral Response Acceleration at Short Periods ( $S_s$ ) . . . . .	1.470 g
Spectral Response Acceleration at a Period of 1.0 Second ( $S_1$ ) . . . . .	0.510 g
Peak Ground Acceleration . . . . .	0.841 g

### **LABORATORY TESTING**

Samples obtained from the borings were returned to the laboratory for further observation and testing. The moisture content of the soils tested ranged from 20.0% to 29.3%, which is likely above optimum moisture content and indicates some drying of site soils will likely be required. The shallow soils (<±2.0 feet) were found to be slightly plastic with a typical liquid limit of 29 and corresponding plasticity index of 8. These values increased in the underlying soils to an average of 46 and 28, respectively. With a minimum of 75.0% fines (passing the No. 200 sieve), these soils would be classify as sandy clay (CL or CH). The deeper soils were found to found to be non-plastic and consisted primarily of sand based on visual observations, resulting in a classification of silty sand (SM). The values of the CL/CH materials indicate these soils could be susceptible to volumetric change with fluctuations in moisture content. Provided the criteria outlined in the **EARTHWORK** section is met or exceeded, the potential vertical rise (PVR) value should be not exceed 1.0 inch. Individual test results are provided in Appendix B.



## **SOIL STRATIGRAPHY**

The results obtained from the laboratory testing allowed classification of the soils encountered. However, the soil stratigraphy depicted on the borings logs was developed from the field logs, observations of the driller, visual classification of the engineer and results of laboratory testing. Changes in percentages of clay, silt, sand and gravel that occur gradually in nature are represented by abrupt changes in the soil classifications shown on the cross sections. As a result, some minor discrepancy may exist between classifications given on the logs and those resulting from laboratory testing. Further, engineering judgement from visual classifications of texture, moisture content and soil consistency may result in some variation of soil classifications shown. The cross sections attempt to best characterize the soils for use in obtaining information and design.

As indicated previously, the shallow soils consisted of slightly plastic clay. Distinct layers of silty clay (CL) were observed at the surface and extended to depths of  $\pm 2.0$  to  $\pm 3.0$  feet in most areas. A more plastic clay, designated as CL-CH on the logs, was encountered beneath these soils and extended to the terminal depths explored in some cases. The presence of this layer designates soils with an increased potential for volumetric change with variations in moisture content. The presence of these soils must be recognized and considered in design to prevent heave of these materials with increases in moisture content. The deeper sands encountered in one boring were found to be non-plastic and classified as silty sand (SM) based on visual observations and results of laboratory testing.

## **EARTHWORK**

The following sections are intended to provide the designer and contractor with guidelines for construction of the project. They are not intended to be used as a specification for construction procedures or methods. It is strongly recommended that any desired modification be reviewed by the soils engineer prior to implementation into the project specifications. Site conditions different from those indicated herein may result in alteration of these recommendations, but should be verified by the soils engineer or his representative.

### **Pre-Construction Considerations:**

The condition of the subgrade materials should be considered a significant factor in the early stages of project planning and construction. The conditions reflected herein are based on the data obtained from the borings and the soil condition at the time of drilling. Data obtained from the borings can be effected by seasonal fluctuations in rainfall and temperatures. Some improvement in the condition of the materials should be expected in the summer months. The presence of soft soils could impact earthwork and undercut quantities. Construction planning and sequencing will

likely be a crucial factor on the amount of undercut required for soft soil conditions. Scarification, aeration, 'wind-rows' and other methods to stabilize soils in-place should be explored prior to making the determination of undercut.

Though efforts have been made to outline climatic factors and their potential impact on construction, some factors also will have a significant impact. Time constraints (proposed schedule) may restrict the contractor's ability to process wet soils. The means and methods of the contractor are not necessarily considered in the recommendations contained herein. The recommendations for site preparation are intended for a normal construction sequence. Prepared subgrade or compacted fill should not be subjected to prolonged periods of weather or construction traffic. Areas intended to be used as staging by the contractor will likely require additional processing and compaction due to distress caused by construction traffic.

It is highly recommended that the geotechnical engineer be included in pre-construction meetings. It would be prudent to perform a limited investigation (probing or test borings) to verify the soil conditions immediately prior to site work and determine if the recommendations contained herein warrant modification.

#### **Site Preparation:**

Existing and proposed grades were not provided, though it is anticipated that varying amounts of cut and fill will be required. Trees, vegetation and topsoil should be removed within the limits of proposed construction. Though a stripping depth on the order of 10.0 inches should suffice in most areas to remove organic laden soils, deeper depths could be required in low lying areas or within the root zones of mature trees. Potentially expansive clays were encountered close to the surface and could require undercut depending on final grades.

Due to the moderately expansive soils encountered in some areas, it is highly recommended that a minimum of 3.0 feet of properly compacted select fill and/or non-expansive subgrade be provided between the top of the CL/CH layer and bottom of the foundations. Similarly, a minimum of 2.0 feet should be provided beneath floor slabs and pavements. The recommended amount of fill may be provided by undercut, raising the proposed grades or a combination of these methods. The silty to sandy clay (CL) present in the top  $\pm 2.0$  feet is not considered to be significantly expansive and would not require undercut if sufficient cover is maintained above the CL/CH layer.

In any case, any required cuts should be performed once the site is cleared and grubbed. The exposed subgrade should be proof rolled with a loaded, tandem axle dump truck in an effort to identify soft, unstable soils. Any soft or unstable soils should be undercut or stabilized prior to fill placement. Data obtained from the borings indicate most soils are firm and stable. For an estimation on the depth and extent of soft soils, the N-values provided on the borings logs should be reviewed. Soils with an N-value exceeding 10 typically perform adequately for proof rolling with minor re-working and re-compaction.

**Fill Placement:**

Fill materials for the project should be granular, less than 50% passing the No. 200 sieve, non-expansive, having a plasticity index (PI) between 5 and 20 (per Section 3.7 of the American Concrete Institute (ACI) 360R), and stable after placement. A minimum approximate dry density of 115.0 pcf is typical for soils meeting this criteria. Off-site fill should be considered for select fill and may consist of locally available soils, such as clayey sand or clayey gravel, but must still be approved by the soils engineer prior to use. The near surface in-situ soils should be considered only marginally suitable for reuse as select fill due to low plasticity and high moisture content. These soils will have a narrow range of moisture where they are workable and would likely require moisture conditioning to be suitable. All select fill should be placed in maximum 8.0-inch loose lifts, moisture conditioned to within two percentage points of optimum moisture content, and compacted to a minimum of 98% Standard compaction. At no time should the particle size of the material exceed the lift thickness. It should be noted that especially during wet or winter months, aeration of fill may be required.

The compaction and moisture content of fill materials should be verified through field density tests. One test per lift should be performed for every 2500 square feet of building areas, but could be increased to 5000 to 10,000 square feet for parking. It would be prudent to require the performance of Atterberg limits and mechanical grain size analyses of fill materials during placement to ensure compliance with the criteria outlined herein as borrow pit soils may vary significantly across the pit.

**Excavation Criteria:**

The alluvial soils encountered at the site should be excavated with normal tracked excavators. No conditions were encountered over the depths investigated that would indicate difficulty with excavations provided that the excavations remain above the shallow perched water table. Trench excavations for utilities should be also completed with normal excavation equipment if the excavations remain above the shallow perched water table. The near surface soils will be prone

to sloughing or cave-ins, especially when saturated or during wet or winter weather. If deeper excavation are required sumping/pumping of the shallow perched water table should be anticipated to improve the stability of the excavations. Based on OSHA regulations (29 CFR 1926, Subpart P) regarding soil classification for trench excavations, the shallow soils encountered above the water table would best classify as Type C. In any case, OSHA regulations regarding shoring or benching of excavations should be considered during construction. Backfilling trench excavations should satisfy the criteria given previously, though ARDOT approved flowable fill may be used as an alternative for confined spaces provided it is allowed to properly cure.

### **Landscaping/Hardscaping:**

The preferred landscaping method is to utilize green areas having a root barrier and a drainage system that will rapidly move water from the building areas. Drip irrigation is preferred so that the amount of water can be controlled and routed away from the buildings ensuring that saturation of the foundation soils will not occur. As a general rule, the drip line of any existing or future full grown tree should not fall within the building areas. Moisture control will also be aided by having sidewalks, paving, properly drained green areas, or sloping ground surfaces for at least 5.0 feet outside the structures. The sidewalks or paving must have positive slope away from the buildings and all joints must be sealed to prevent water infiltration. Implementation of these points will reduce the introduction of moisture into the foundation soils and minimize the resulting adverse effects, including movements of the foundations and floor slabs. It would also be prudent to ensure that roof drain outlets and AC unit condensate drip lines exit at least 10.0 feet beyond the building footprint. By doing so, the likelihood of distress from increased soil moisture beneath buildings, landscapes, and pavements is greatly decreased.

### **Adverse Weather Conditions:**

Site grading and earthwork operations will be more difficult in wet or winter months. Should earthwork operations for the project begin in the time period of November through May, the owner should anticipate and budget for additional expenses for earthwork. Not only will more frequent and saturating rains be prevalent during these months, ambient air conditions are not conducive to drying of site soils. Efficient aeration and drying of soils is dependent upon high temperatures, low humidity, and the contractor's ability to disc or scarify the soils. Aeration and drying of on-site soils will require additional effort by the contractor and should be considered during budgeting or planning. Wet conditions may also require drying of otherwise suitable soils.

Should the owner or contractor elect to begin earthwork in wet or winter months, undercut of soft soils will likely be the most feasible option. Mechanical stabilization of the on-site soils is possible and could include the use of a geotextile fabric/grid to bridge over soft soils and provide

support to subsequent fill. Implementation of a geotextile will require willingness and cooperation of the contractor for success. Chemical stabilization through lime or fly ash worked into wet soils can also be effective. However, these methods are also highly dependent upon the contractor's expertise, equipment, and proper installation or mixing methods. In any case, the proposed construction area should be maintained in a well drained condition during construction. Water should not be allowed to stand or pond on areas of exposed earthwork. In anticipation of rainfall, it would be prudent for the contractor to "seal" exposed subgrades with a smooth drum roller to promote runoff. Additionally, surface drainage control features, including drainage ditches, should be installed as soon as it is practical.

## **FOUNDATIONS**

Conventional shallow foundations are considered the most feasible foundation option based on the anticipated loadings, site conditions, and earthwork criteria established in the previous section. The following discussion will provide bearing capacity, settlement, and other criteria typically required for in design. For the purposes of this report, bearing capacity refers to the net allowable bearing capacity, which is defined by the ultimate bearing capacity (factored dead and live loads) reduced by an acceptable factor of safety, which for this project is considered to be 2.0. Additionally, shape, inclination, groundwater depth, and other design factors are considered minimal and no reduction in bearing capacity are necessary for these conditions.

### **Bearing Capacity:**

Based on the results of our field investigation, a bearing capacity of 2000 psf may be applicable for footing bearing in adequate natural ground or property compacted select fill. The designers should maintain a minimum of 3.0 feet of fill and/or clay (CL) between the bottom of footings and top of CL/CH layer. Should the designer desire to vary the bearing depths or capacities, this firm should be consulted for additional recommendations. It should be noted that the provided bearing capacity is applicable only if all criteria in the **EARTHWORK** section is met or exceeded. Interior footing depths could be decreased if allowed by local building codes. Exterior foundations should penetrate below the frost line, which for Brookland, Arkansas is estimated at 14.0 inches.

### **Settlement:**

The settlement must be within tolerable limits, which should be established by the structural engineer, but have not been provided prior to this investigation. The potential settlement for conventional footings was estimated from results of Standard Penetration tests performed during drilling. The magnitude of total settlement at the recommended bearing capacity and depth was

estimated to be on the order of 1.00 inch. A differential settlement on the order of 0.50 inch is recommended for use in the structural design. Should the bearing capacity or loads used in design differ from those indicated herein, the amount of settlement will vary accordingly.

**Other Design Considerations:**

The bearing capacity and settlement discussions provided previously assume that the structural loadings are positioned such that a relatively uniform bearing pressure is exerted to the bearing strata. Eccentric, inclined or other loadings that result in a non-uniform bearing pressure will require further evaluation by this firm once specific loading conditions are established. In any case, it would be prudent to increase the rigidity of the foundation in an effort to minimize potential differential movements. An increase in rigidity can be achieved by techniques that would increase the section modulus of the foundation members. Column and wall footings should be designed in accordance with the requirements of the various applicable codes.

Resisting uplift loads should consider the weight of the footing and overlying soil backfill. A minimum factor of safety of 1.5 is recommended when calculating uplift resistance. For resistance of lateral forces, a net allowable passive resistance of 250 psf can be used for the portion of the footing extending below 1.5 feet. A coefficient of sliding resistance of 0.36 may be used by the designer to calculate frictional resistance along the bottom surface of the footing.

**Excavation/Monitoring:**

The excavations should be performed with equipment capable of providing a clean bearing surface. It would be ideal for the bottom 6.0 inches of the excavation be achieved with a smooth plate excavator, or hand labor. Reinforcing steel and concrete should be placed as soon as possible upon completion of the geotechnical representative evaluation, as described below. All debris, standing water and mud, including saturated soils, should be removed. In no instance should concrete be placed in frozen or saturated soils. If unforeseen circumstances require excavations to remain open for an extended period, a thin “mud slab” may be placed in an effort to reduce disturbance or drying of the bearing strata. In this case, the excavation should extend a minimum of 2.0 inches below planned depth, allowing a thin layer of concrete the same strength as required for the footings to be placed.

The performance of the foundation system will partially depend on the quality of construction. It would be prudent to have further evaluations by the soils engineer, or his representative, to verify that the design bearing value has been achieved in excavations. Furthermore, the condition

of the subgrade should be evaluated to insure cleanliness and uniformity of bearing strata immediately prior to concrete placement. Bearing capacity can be verified by the use of a static cone penetrometer, or other acceptable means designated by the soils engineer.

### **FLOOR SLABS**

Differential movement of the floor slab may be caused by a difference in the allowable gross bearing capacity, differing heave conditions, and/or variable thicknesses of compressible soils below the floors. The stiffness effect of a well compacted subgrade and/or engineered fill in conjunction with a granular base, collectively known as the soil support system, should greatly diminish the differential floor slab movements to tolerable limits. It is anticipated that the soil support system will consist of a minimum of 8.0 inches of subgrade or 2.0 feet of compacted select fill overlain by a free-draining granular fill. For this condition the designer should consider a Modulus of Subgrade Reaction (k) of 100.0 pci over the top 8.0 inches of subgrade. The floor slabs and soil support system should be designed and constructed in accordance with American Concrete Institute (ACI) Publications 302.1R-15, Guide for Concrete Floor and Slab Construction, and 360R-10, Guide to Design of Slabs-on-Ground, and other applicable codes.

### **Subgrade Preparation:**

Initially, the recommendations in the **EARTHWORK** section, including proof rolling and moisture/compaction testing, should be followed to prepare the subgrade. However, the designer should specify that after destructive/intrusive construction activities, such as weathering, construction traffic, and utility placement, the contractor should be required to restore the top 8.0 inches of subgrade to its specified moisture, density, and grade control immediately prior to slab placement. This rehabilitation should be verified through quality control testing and a rod and level survey, as directed by ACI 302.1R-15, Subsection 6.1. This will aid in prevention of post construction slab movements induced by moisture variations inherent to any soil type, especially for exposed or polished floors with no covering.

### **Granular Base:**

As per ACI 302.1R-15, Subsection 6.1.4, the granular base should consist of a clean, densely graded granular material with a balanced fine content that produces a low-friction surface while minimizing wicking. This material should have 100% passing the 1½ inch (38 mm) sieve, 15% to 50% passing the No. 4 (4.75 mm) sieve, and less than 12% passing the No. 200 (75 µm) sieve or satisfy the requirements of ASTM D1241 with the modification allowance of less than 12% passing the No. 200 (75 µm) sieve. Additionally, the material passing the No. 200 (75 µm) sieve

should be clean granular fill with less than 3% clay or friable particles. It should be noted, the ACI code states that clean/cushion/concrete sand “meeting ASTM C33/C33M, will not be adequate”. The base material should be placed and compacted with adequate quality control testing and grade control that conforms to ACI 117 with verification by rod and level survey.

### **Vapor Membrane:**

The need for a vapor membrane depends on whether the floor slab will have a vapor sensitive covering, will have vapor sensitive items stored on the slab, or if the space above the slab will be a humidity controlled area. If the project does not have this vapor sensitivity or moisture control need, placement of a vapor membrane may not be necessary. However, if any of the above sensitivity issues apply, placement of a minimum 10-mil vapor membrane is recommended. Some floor covering systems (adhesives and flooring materials) may require a vapor membrane to maintain a specified maximum slab moisture content as a condition of their warranty. The architect/engineer should decide on a case-by-case basis whether to place the vapor membrane above or below the granular layer. The guidelines in ACI 302.1R-15, Subsection 6.1.5, and ACI 302.2R-06, Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials, should be considered when determining the location of vapor membranes and the relation to floor finishes, project conditions, schedule, and the potential effects of slab curling and cracking.

### **DRIVES AND PARKING AREAS**

Pavement design is dependent not only on site soil conditions but on other variables such as anticipated cuts and fills, subgrade drainage, vehicle types and traffic counts, intended design life, quality control during construction, and long term pavement maintenance. While numerous reasonable assumptions were made concerning these variables, specific information about design life and traffic data has not been provided. Additionally, it is the owners responsibility to conduct the long term maintenance that is critical to pavement performance. The following pavement designs are based on methodology utilizing California Bearing Ratio (CBR) data that is estimated from field investigation, laboratory testing, and generally accepted industry standards. The recommended pavement structures are graphically presented on Plate 12.

### **Pavement Subgrade:**

The pavement subgrade will remain the same for the various pavement types and locations. As specified in the **EARTHWORK** section of this report, the pavement subgrade should consist of 2.0 feet of compacted select fill. Criteria outlined in the **EARTHWORK** section of this report should provide a minimum subgrade CBR of 3 for a minimum 8.0 inches of subgrade with a modulus of subgrade reaction (k) of 100.0 pci for the rigid pavement section. The designer



should specify that after exposure to weathering and destructive/intrusive construction activities, such as construction traffic and utility placement, the contractor should be required to restore the top 8.0 inches of subgrade to its specified moisture, density, and grade control immediately prior to base placement.

**Flexible Pavement:**

Flexible pavement typically consists of asphalt cement hot mix (ACHM) as specified by Section 407 of the Standard Specifications for Highway Construction (2014 edition) as published by the Arkansas Department of Transportation (ARDOT). The design requirements for ACHM surface course: 12.5mm and 9.5mm are provided in Tables 407-1 and 407-2, respectively. ACHM is most commonly used for light to moderate traffic areas including straight drives and parking areas for relatively light vehicles. It should not be used in heavy traffic lanes where trucks turn, backup or pick up trash dumpsters. The Class 7 Base should be composed of 90% crushed stone meeting ARDOT Table 303-1 and should be compacted to not less than 98% Modified (ASTM D 1557) compaction. The compaction of the ACHM surface course shall not be less than 92% of the theoretical mix design and not less than 90% at any joint.

Light Traffic:	2.0" ACHM Surface Course (ARDOT 12.5 mm or 9.5 mm) 6.0" Crushed Stone Base (ARDOT Class 7)
Heavy Traffic:	3.0" ACHM Surface Course (ARDOT 12.5 mm or 9.5 mm) 8.0" Crushed Stone Base (ARDOT Class 7)

**Rigid Pavement:**

Rigid or Portland Cement Concrete (PCC) pavements consists of concrete materials and construction procedures as specified by Section 501 of the Standard Specifications for Highway Construction (2014 edition) as published by the Arkansas Department of Transportation (ARDOT). The material type and design requirements including admixtures, reinforcing, dowels, jointing, curing, and finish are provided therein. Approach slabs, truck turning areas, docks, and dumpster pads should be PCC as a minimum. The PCC should have a design strength of 4000 psi at 28 days with 5% air entrainment. The load transfer, dowels, and joints for the PCC should be per ACI, ARDOT, or PCA guidelines. For dumpster approaches and pads the concrete thickness should be increased to 10.0 inches.

Light Traffic:	5.0" Concrete ( $f'c = 4000$ psi) 4.0" Crushed Stone Base (ARDOT Class 7)
Heavy Traffic:	7.0" Concrete ( $f'c = 4000$ psi) 6.0" Crushed Stone Base (ARDOT Class 7)

### **Pavement Performance/Maintenance:**

The long term pavement performance will be directly related to several factors such as adequate edge drainage and surface drainage which does not allow water to accumulate on the pavement surface or behind the curbs and pavement edges. All pavement joints must be sealed and should be placed parallel to the overall site drainage direction. All irrigation, water, and other utility lines should be carefully monitored to insure they do not contribute to premature pavement failure by allowing water to migrate onto or under the pavements. Adequate quality control testing including proof rolling, compaction testing, and thickness testing of base and ACHM is critical to successful long term pavement performance. In addition, pavements will require regular maintenance such as periodic surface and crack sealing to prolong the desired performance and life.

### **QUALITY CONTROL**

In order to achieve quality workmanship to help ensure that the specified end results are achieved, and to make certain that the continued satisfactory performance of the project is assured, extensive quality control and monitoring of the work performed should be required. This should include a qualified quality control agency, with a technician serving in a surveillance and documentation capacity as inspector for the designers, owners, and builders, to provide the assurance for achieving the specified compliance. The technician should be prepared to perform the tests on all items of work daily and/or routinely as may be required. The quality control testing agency should be given responsibility in the testing and evaluation of the work, under the guidance of the Owner's representative, but not to the extent of negating the contractual documents or the obligation of additional construction funds. Finally, the ASTM standard testing procedures should be used to the fullest extent possible in the quality control program, supplemented by various other state or local specifications on some items of the work when applicable.

### **CONCLUSIONS AND RECOMMENDATIONS**

As a result of this geotechnical investigation, the following recommendations are offered for consideration:

1. As previously discussed, conventional footings would serve satisfactorily for the proposed structures. Conventional footings should be designed in accordance with the necessary structural and/or architectural requirements.
2. Conventional footings should be designed utilizing a maximum allowable bearing of 2000 psf at a depth of 2.0 feet below the finished floor on adequate natural ground and/or 3.0 feet of select compacted fill.

3. Low PI, non-expansive fill soils shall be placed in 8.0-inch thick lifts within two percent of optimum moisture content to 98% Standard Proctor density as per ASTM D 698. The select fill shall have a PI between 5 and 20. At the contractor's option, clayey sand (SC) or clay gravel (GC) may be utilized if approved by the soils engineer.
4. Perimeter surface drainage should be assured around the exterior of the building to intercept and drain surface runoff or seepage water from the near surface and foundation support soils. It would also be a prudent measure to slope backfill soils away from foundation walls and otherwise protect the structure from moisture infiltration.
5. Quality control testing should be utilized in the construction of the foundation, undercutting, fill placement, and floor slab construction with adequate testing to verify that the design requirements have been achieved.
6. The use of flexible or rigid pavements should be a function of the anticipated traffic use as determined by the designer using the recommended sections provided on pages 12 and 13 of this report. As a minimum PCC pavements should be used for truck lanes and dumpster pads.
7. Geotechnical engineering services by a qualified firm are recommended during the foundation construction phase so that adequate compensation can be made for conditions that may occur which differ significantly from those assumed as a result of this investigation.
8. Other recommendations are given throughout the text of this report.

### **LIMITATIONS**

The boring logs shown in this report contain information related to the types of soil encountered at specific locations and times and show lines delineating the interface between these materials, as well as results of tests performed in the laboratory on representative samples. The logs also contain our field technician's interpretation of conditions that are believed to exist in those depth intervals between the actual samples taken. Therefore, these boring logs contain both factual and interpretative information. It is not warranted that these logs are representative of subsurface conditions at other locations and times.

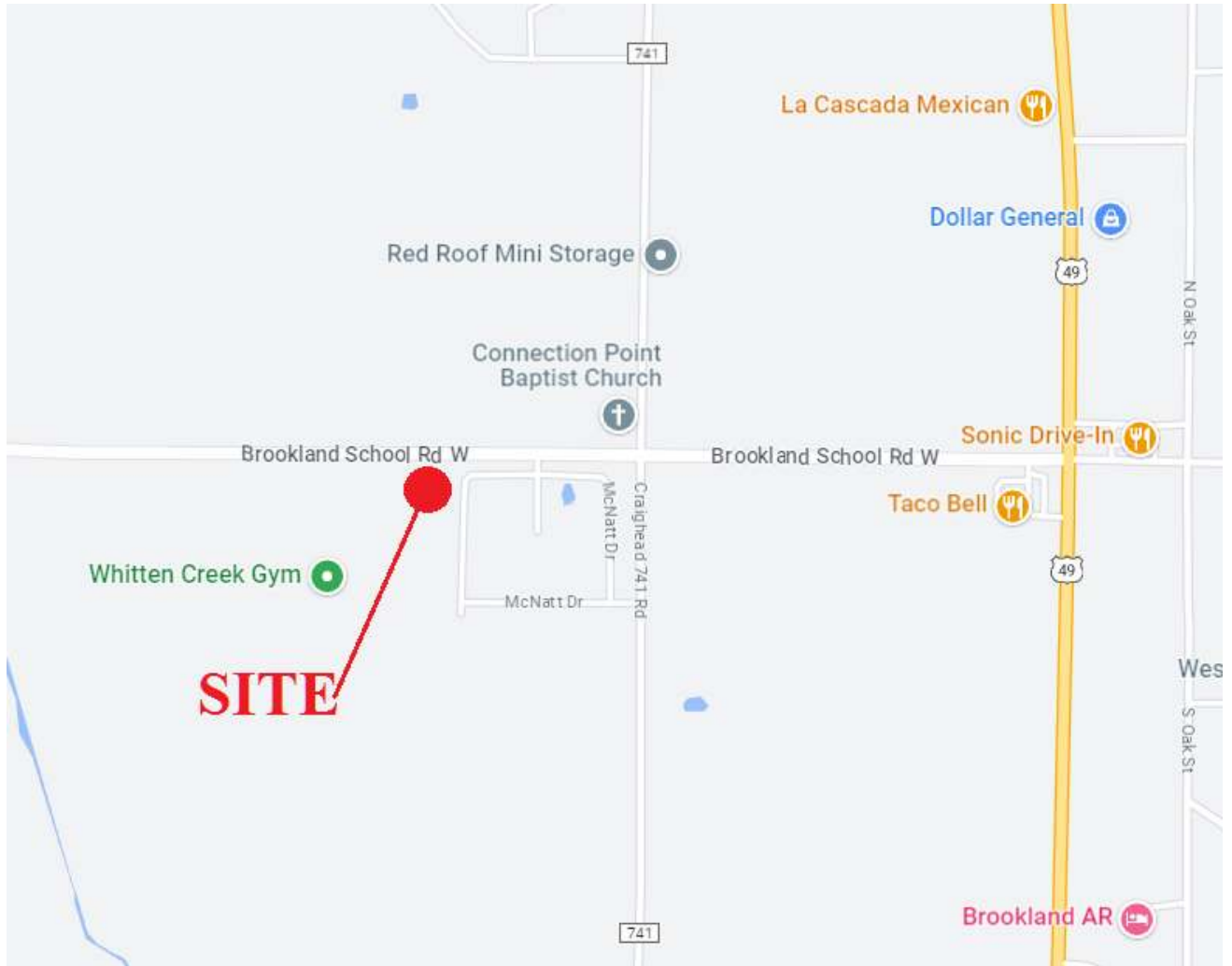
The analyses, conclusions, and recommendations contained in this report are based on site conditions as they existed at the time of our field investigation and further on the assumption that the exploratory borings are representative of the subsurface conditions throughout the site. If, during construction, different subsurface conditions from those encountered in our borings are observed, or appear to be present beneath excavations, we must be advised promptly so that we can review these conditions and provide new recommendations as becomes necessary. Recognize that both natural and manmade events may have changed site conditions since issuance of this

report and further review may result. If after submission of this report structural loads or finished grades are changed from those that were assumed, we urge that we be promptly informed, and retained to review our report to determine the applicability of the conclusions and recommendations, considering the changed conditions and/or time lapse. Further, we request that our firm be retained to review those portions of the plans and specifications for this particular project that pertain to earthwork and foundations as a means to determine whether the plans and specifications are consistent with the recommendations contained in the report.

It should be understood that there is the possibility that even with the proper application of current engineering principles, conditions may exist on the site that could not be identified within the scope of this investigation or which were not reasonably identifiable from the available information. The conclusions and recommendations in this report contain all the limitations inherent to the principles and practice of geotechnical engineering. AECI has not performed any observations, investigation, study, or testing that is not specifically listed in the scope of services. Thus, AECI shall not be liable for failing to discover any condition whose discovery required the performance of services outside of the scope of services provided in our proposal.

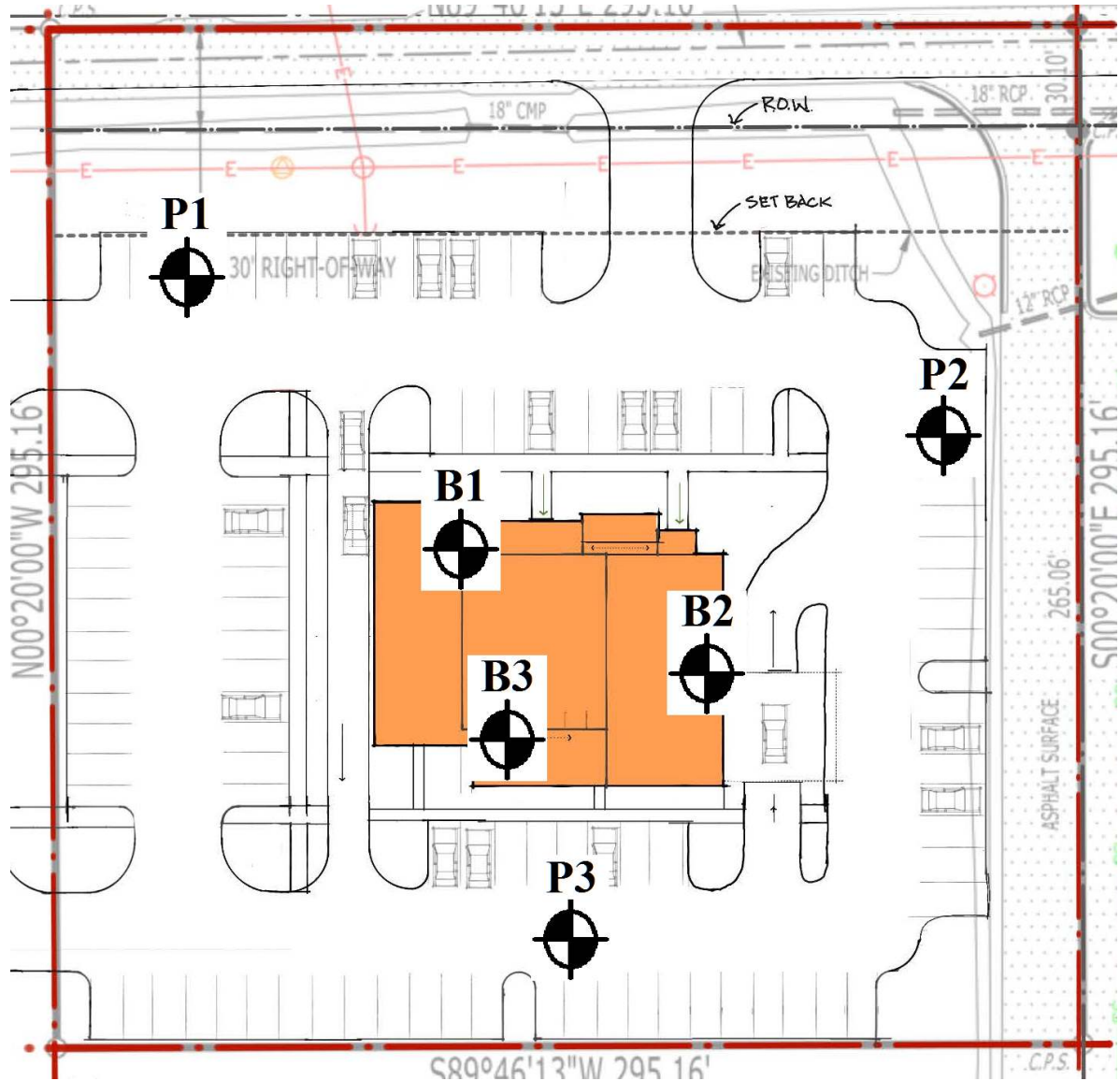
\* \* \* \* \*

APPENDIX A  
PLATES

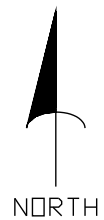


VICINITY MAP  
BROOKLAND, ARKANSAS

NOT DRAWN TO SCALE.



# PLAN OF BORINGS



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**LOG OF BORING**

**PROJECT:** BROOKLAND CITY HALL & POLICE DEPARTMENT **BORING NO:** B1  
 BROOKLAND, ARKANSAS  
**FOR:** CIVIL ENGINEERING ASSOCIATES, LLC **LOCATION:** SEE PLAN OF BORINGS  
**DATE:** 06/25/23 **JOB NO:** 17332 **BORING TYPE:** AUGER/WASH/SPT  
**DRILLER:** JOHNSON **GEOTECHNICIAN:** JOHNSON **GROUND ELEVATION:** NOT FURNISHED  
 HILYARD ATV

Depth In Feet	Sample Type & No	N-Blows Per Foot	Graphic Symbol	LEGEND		
				S Shelby Tube ■ Core ▽ Static Water Table	NV Diamond Core ⊠ Standard Penetration ▼ Hydrostatic Water Table	P Penetration Test ⊞ J - Jar ⊞ No Recovery
VISUAL DESCRIPTION OF STRATUM						
0				9.0 INCHES TOPSOIL VERY STIFF MOIST BROWN CLAY (CL) PP = 2.25 KSF		
	P1	22				
	P2	15		MEDIUM STIFF TO VERY STIFF MOIST BROWN CLAY (CL/CH) PP = 1.50 KSF		
5	P3	7		CONTINUES (CL/CH) PP = 0.75 KSF		
	P4	9		CONTINUES (CL/CH) PP = 1.00 KSF		
10	P5	13		CONTINUES (CL/CH) PP = 1.50 KSF		
	P6	20		CONTINUES (CL/CH) PP = 2.00 KSF		
20	P7	50/6"		MEDIUM DENSE TO VERY DENSE MOIST BROWN SILTY SAND (SM)		
	P8	22		CONTINUES (SM)		
BOTTOM OF HOLE AT 26.5 FEET. BORING REMAINED OPEN. WATER ENCOUNTERED AT 20.0 FEET UPON COMPLETION OF DRILLING.						



**LOG OF BORING**

**PROJECT:** BROOKLAND CITY HALL & POLICE DEPARTMENT **BORING NO:** B2  
 BROOKLAND, ARKANSAS  
**FOR:** CIVIL ENGINEERING ASSOCIATES, LLC **LOCATION:** SEE PLAN OF BORINGS  
**DATE:** 06/25/23 **JOB NO:** 17332 **BORING TYPE:** AUGER/WASH/SPT  
**DRILLER:** JOHNSON **GEOTECHNICIAN:** JOHNSON **GROUND ELEVATION:** NOT FURNISHED  
 HILYARD ATV

Depth In Feet	Sample Type & No	N-Blows Per Foot	Graphic Symbol	LEGEND		
				S Shelby Tube ■ Core ▽ Static Water Table	NV Diamond Core ⊠ Standard Penetration ▼ Hydrostatic Water Table	P Penetration Test ⊠ J - Jar ⊠ No Recovery
VISUAL DESCRIPTION OF STRATUM						
0				8.0 INCHES TOPSOIL STIFF MOIST BROWN CLAY (CL) PP = 1.00 KSF		
	P1	10		STIFF TO VERY STIFF MOIST BROWN CLAY (CL/CH) PP = 1.25 KSF		
	P2	12		CONTINUES (CL/CH) PP = 1.50 KSF		
5	P3	14		CONTINUES (CL/CH) PP = 1.00 KSF		
	P4	10		CONTINUES (CL/CH) PP = 2.50 KSF		
10	P5	23		CONTINUES (CL/CH) PP = 3.00 KSF		
	P6	28		CONTINUES (CL/CH) PP = 1.75 KSF		
15	P7	17		CONTINUES (SM) PP = 2.00 KSF		
20	P8	20		BOTTOM OF HOLE AT 26.5 FEET. BORING REMAINED OPEN. NO WATER ENCOUNTERED IN THIS BORING.		
25						

### LOG OF BORING

**PROJECT:** BROOKLAND CITY HALL & POLICE DEPARTMENT **BORING NO:** B3  
 BROOKLAND, ARKANSAS  
**FOR:** CIVIL ENGINEERING ASSOCIATES, LLC **LOCATION:** SEE PLAN OF BORINGS  
**DATE:** 06/25/23 **JOB NO:** 17332 **BORING TYPE:** AUGER/WASH/SPT  
**DRILLER:** JOHNSON **GEOTECHNICIAN:** JOHNSON **GROUND ELEVATION:** NOT FURNISHED  
 HILYARD ATV

Depth In Feet	Sample Type & No	N-Blows Per Foot	Graphic Symbol	LEGEND		
				S Shelby Tube ■ Core ▽ Static Water Table	NV Diamond Core ⊠ Standard Penetration ▼ Hydrostatic Water Table	P Penetration Test ⊠ J - Jar ⊠ No Recovery
VISUAL DESCRIPTION OF STRATUM						
0				9.0 INCHES TOPSOIL STIFF MOIST BROWN CLAY (CL) PP = 1.50 KSF		
	P1	13		STIFF TO VERY STIFF MOIST BROWN CLAY (CL/CH) PP = 1.50 KSF		
5	P2	13		CONTINUES (CL/CH) PP = 1.00 KSF		
	P3	10		CONTINUES (CL/CH) PP = 1.25 KSF		
	P4	11		CONTINUES (CL/CH) PP = 2.00 KSF		
10	P5	19		CONTINUES (CL/CH) PP = 2.50 KSF		
	P6	25		CONTINUES (CL/CH) PP = 1.75 KSF		
15	P7	16		CONTINUES (SM) PP = 2.00 KSF		
20	P8	19		BOTTOM OF HOLE AT 26.5 FEET. BORING REMAINED OPEN. NO WATER ENCOUNTERED IN THIS BORING.		
25						

**LOG OF BORING**

**PROJECT:** BROOKLAND CITY HALL & POLICE DEPARTMENT **BORING NO:** P1  
 BROOKLAND, ARKANSAS  
**FOR:** CIVIL ENGINEERING ASSOCIATES, LLC **LOCATION:** SEE PLAN OF BORINGS  
**DATE:** 06/25/23 **JOB NO:** 17332 **BORING TYPE:** AUGER/WASH/SPT  
**DRILLER:** JOHNSON **GEOTECHNICIAN:** JOHNSON **GROUND ELEVATION:** NOT FURNISHED  
 HILYARD ATV

Depth In Feet	Sample Type & No	N-Blows Per Foot	Graphic Symbol	LEGEND		
				S Shelby Tube	NV Diamond Core	P Penetration Test
				▣ Core	⊠ Standard Penetration	▤ J - Jar
				∇ Static Water Table	∇ Hydrostatic Water Table	▨ No Recovery
VISUAL DESCRIPTION OF STRATUM						
0				10.0 INCHES TOPSOIL		
	P1	19	▣	VERY STIFF MOIST BROWN CLAY (CL) PP = 2.00 KSF		
	P2	14	▣	MEDIUM STIFF TO STIFF MOIST BROWN CLAY (CL/CH) PP = 1.50 KSF		
5	P3	8	▣	CONTINUES (CL/CH) PP = 1.00 KSF		
	P4	9	▣	CONTINUES (CL/CH) PP = 1.00 KSF		
10	P5	12	▣	CONTINUES (CL/CH) PP = 1.25 KSF		
				BOTTOM OF HOLE AT 11.5 FEET. BORING REMAINED OPEN. NO WATER ENCOUNTERED IN THIS BORING.		
15						
20						
25						

**LOG OF BORING**

**PROJECT:** BROOKLAND CITY HALL & POLICE DEPARTMENT **BORING NO:** P2  
 BROOKLAND, ARKANSAS  
**FOR:** CIVIL ENGINEERING ASSOCIATES, LLC **LOCATION:** SEE PLAN OF BORINGS  
**DATE:** 06/25/23 **JOB NO:** 17332 **BORING TYPE:** AUGER/WASH/SPT  
**DRILLER:** JOHNSON **GEOTECHNICIAN:** JOHNSON **GROUND ELEVATION:** NOT FURNISHED  
 HILYARD ATV

Depth In Feet	Sample Type & No	N-Blows Per Foot	Graphic Symbol	LEGEND		
				S Shelby Tube	NV Diamond Core	P Penetration Test
				▣ Core	⊠ Standard Penetration	▤ J - Jar
				∇ Static Water Table	∇ Hydrostatic Water Table	▨ No Recovery
VISUAL DESCRIPTION OF STRATUM						
0				10.0 INCHES TOPSOIL STIFF MOIST BROWN CLAY (CL) PP = 1.00 KSF		
	P1	10				
	P2	15		STIFF TO VERY STIFF MOIST BROWN CLAY (CL/CH) PP = 1.50 KSF		
5						
	P3	11		CONTINUES (CL/CH) PP = 1.25 KSF		
	P4	12		CONTINUES (CL/CH) PP = 1.25 KSF		
10						
	P5	22		CONTINUES (CL/CH) PP = 2.25 KSF		
				BOTTOM OF HOLE AT 11.5 FEET. BORING REMAINED OPEN. NO WATER ENCOUNTERED IN THIS BORING.		
15						
20						
25						

**LOG OF BORING**

**PROJECT:** BROOKLAND CITY HALL & POLICE DEPARTMENT **BORING NO:** P3  
 BROOKLAND, ARKANSAS  
**FOR:** CIVIL ENGINEERING ASSOCIATES, LLC **LOCATION:** SEE PLAN OF BORINGS  
**DATE:** 06/25/23 **JOB NO:** 17332 **BORING TYPE:** AUGER/WASH/SPT  
**DRILLER:** JOHNSON **GEOTECHNICIAN:** JOHNSON **GROUND ELEVATION:** NOT FURNISHED  
 HILYARD ATV

Depth In Feet	Sample Type & No	N-Blows Per Foot	Graphic Symbol	LEGEND		
				S Shelby Tube ■ Core ▽ Static Water Table	NV Diamond Core ⊠ Standard Penetration ▼ Hydrostatic Water Table	P Penetration Test ⊞ J - Jar ⊞ No Recovery
VISUAL DESCRIPTION OF STRATUM						
0				10.5 INCHES TOPSOIL		
	P1	15		STIFF MOIST BROWN CLAY (CL) PP = 1.50 KSF		
	P2	14		STIFF TO VERY STIFF MOIST BROWN CLAY (CL/CH) PP = 1.50 KSF		
5	P3	11		CONTINUES (CL/CH) PP = 1.25 KSF		
	P4	15		CONTINUES (CL/CH) PP = 1.50 KSF		
10	P5	17		CONTINUES (CL/CH) PP = 1.75 KSF		
				BOTTOM OF HOLE AT 11.5 FEET. BORING REMAINED OPEN. NO WATER ENCOUNTERED IN THIS BORING.		
15						
20						
25						

## FIELD CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

### NON COHESIVE SOILS

(Silt, Sand, Gravel and Combinations)

#### Density

Very Loose	- 0 to 4 blows/ft.
Loose	- 4 to 10 blows/ft.
Medium Dense	- 10 to 30 blows/ft.
Dense	- 30 to 50 blows/ft.
Very Dense	- over 50

#### Particle Size Identification

Boulders	- 8-inch diameter or more
Cobbles	- 3 to 8-inch diameter
Gravel	- Coarse - 1 to 3-inch
	Medium - 1/2 to 1-inch
	Fine - 1/4 to 1/2-inch
Sand	- Coarse - 0.6 mm to 1/4-inch (dia. of pencil lead)
	Medium - 0.2 mm to 0.6 mm (dia. of broom straw)
	Fine - 0.05 mm to 0.2 mm (dia. of human hair)
Silt	- 0.06 mm to 0.002 mm (Cannot see particles)

#### Relative Proportions

<u>Descriptive Term</u>	<u>Percent</u>
Trace	1 to 10
Little	11 to 20
Some	21 to 35
And	36 to 50

### COHESIVE SOILS

(Clay, Silt and Combinations)

#### Consistency

Very Soft	- < 2 blows/ft.
Soft	- 2 to 4 blows/ft.
Medium Stiff	- 4 to 8 blows/ft.
Stiff	- 8 to 15 blows/ft.
Very Stiff	- 15 to 30 blows/ft.
Hard	- over 30

#### Plasticity

<u>Degree of Plasticity</u>	<u>Plasticity Index</u>
None to slight	0 to 4
Slight	5 to 7
Medium	8 to 22
High to Very High	over 22

### NOTES

**Classification** - The classifications given on the logs are made by visual inspection.

**Standard Penetration Test** - Driving a 2.0-inch O.D., 1 3/8-inch I.D., sampler a distance of 1.0 foot into undisturbed soil with a 140-pound hammer free falling a distance of 30.0 inches. It is customary for AEIC to drive the spoon 6.0 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and making the tests are recorded for each 6.0 inches of penetration on the drill log (Example: 6/8/9). The standard penetration test results can be obtained by adding the last two figures (i.e., 8 + 9 = 17 blows/ft.).

**Strata Changes** - In the column "Soil Descriptions" on the drill log the horizontal lines represent strata changes. A solid line ( — ) represents an actually observed change, a dashed line ( - - - ) represents an estimated change.

**Groundwater** - The groundwater observations were made at the times indicated. Porosity of soil strata, weather conditions, site topography, etc., may cause changes in the water levels indicated on the logs.

## KEY TO SOIL CLASSIFICATIONS AND SYMBOLS

UNIFIED SOIL CLASSIFICATION SYSTEM <sup>(1)</sup>				TERMS CHARACTERIZING SOIL STRUCTURE <sup>(2)</sup>	
Major Divisions	Letter	Symbol		Name	
		Hatching	Color		
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW		RED	SLICKENSIDED - having inclined planes of weakness that are slick and glossy in appearance.
		GP		RED	FISSURED - containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.
		GM		YELLOW	LAMINATED (VARVED) - composed of thin layers of varying color and texture, usually grading from sand or silt at the bottom to clay at the top.
		GC		YELLOW	CRUMBLY - cohesive soils which break into small blocks or crumbs on drying.
	SAND AND SANDY SOILS	SW		RED	CALCAREOUS - containing appreciable quantities of calcium carbonate, generally nodular.
		SP		RED	WELL GRADED - having wide range in grain sizes and substantial amounts of all intermediate particle sizes.
		SM		YELLOW	POORLY GRADED - predominantly of one grain size (uniformly graded) or having a range of sizes with some intermediate size missing (gap or skip graded).
		SC		YELLOW	
FINE GRAINED SOILS	SILTS AND CLAYS LL<50	ML		GREEN	<b>SYMBOLS FOR TEST DATA</b>  M/C = 15 - Natural moisture content in percent. γ = 95 - Dry unit weight in pounds/cubic foot. Qu = 1.23 - Unconfined compression strength in tons/square foot. Qc = 1.68 (21 psi) - Confined compression strength at indicated lateral pressure. 51-21-30 - Liquid limit, Plastic limit, and Plasticity index. 30% FINER - Percent finer than No. 200 mesh sieve. 30 B/F - Blows per foot, Standard Penetration test. ▼ - Hydrostatic water table. ▽ - Static water table.
		CL		GREEN	
		OL		GREEN	
	SILTS AND CLAYS LL>50	MH		BLUE	
		CH		BLUE	
		OH		BLUE	
HIGHLY ORGANIC SOILS	Pt		ORANGE		

### TERMS DESCRIBING CONSISTENCY OF SOILS<sup>(2)</sup>

COARSE GRAINED SOILS		FINE GRAINED SOILS		
DESCRIPTIVE TERM	NO. BLOWS/FOOT STANDARD PEN. TEST	DESCRIPTIVE TERM	NO. BLOWS/FOOT STANDARD PEN. TEST	UNCONFINED COMPRESSION TONS PER SQ. FT.
Very Loose	0 - 4	Very Soft	<2	<0.25
Loose	4 - 10	Soft	2 - 4	0.25 - 0.50
Firm (medium dense)	10 - 30	Plastic (medium stiff)	4 - 8	0.50 - 1.00
Dense	30 - 50	Stiff	8 - 15	1.00 - 2.00
Very Dense	over 50	Very Stiff	15 - 30	2.00 - 4.00
		Hard	over 30	over 4.00

Field classification for "Consistency" is determined with a 0.25-inch diameter penetrometer.

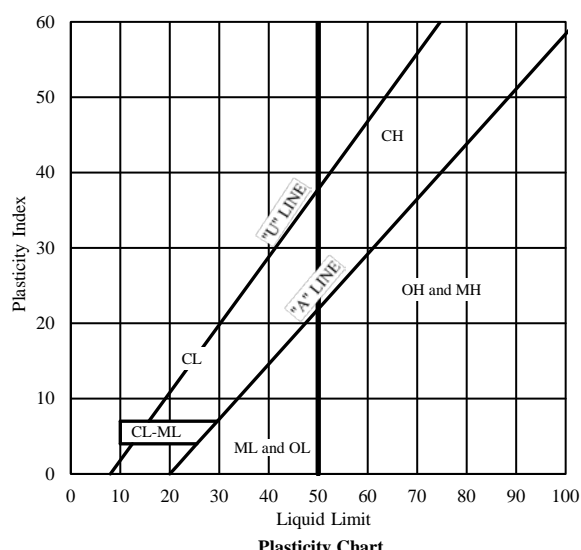
(1) - From Waterways Experiment Station Technical Memorandum No. 3-357

(2) - From "Soil Mechanics in Engineering Practice" by Terzaghi and Peck

## UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

Major divisions		Group Symbols	Typical Names	Laboratory Classifications Criteria			
Coarse-grained soils (More than half of material is larger than No. 200 sieve size)	Gravels (more than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4	$C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3	
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines			Not meeting all gradation requirements for GW
		Gravels with fines (Appreciable amount of fines)	GM*	d	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. Between 4 and 7 are borderline cases requiring use of dual symbols
				u			
	GC	Clayey gravels, gravel-sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7				
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4	$C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3	
			SP	Poorly graded sands, gravelly sands, little or no fines			Not meeting all gradation requirements for SW
		Sands with fines (Appreciable amount of fines)	SM*	d	Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in hatched zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
				u			
	SC	Clayey sands, sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7				
Fine-grained soils (More than half of material is smaller than No. 200 sieve)	Silt and clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity				
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays				
		OL	Organic silts and organic silty clays of low plasticity				
	Silt and clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts				
		CH	Inorganic clays of high plasticity, fat clays				
		OH	Organic clays of medium to high plasticity, organic silts				
	Pt	Highly Organic soils	Peat and other highly organic soils				

Determine percentages of sand and gravel from grain-size curve. Depending on percentages of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:  
 Less than 5 percent ..... GW, GP, SW, SP  
 More than 12 percent ..... GM, GC, SM, SC  
 5 to 12 percent ..... Borderline cases requiring dual symbols \*\*

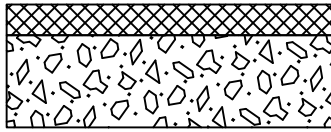


\*Division of GM and SM groups into subdivisions of d and u are for roads and airfield only. Subdivision is based on Atterberg limits; suffix d used when L.L. is 28 or less and the P.I. is 6 or less; u used when L.L. is greater than 24.

\*\*Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example GW-GC, well-graded gravel-sand mixture with clay binder.



## TYPICAL PAVEMENT STRUCTURES

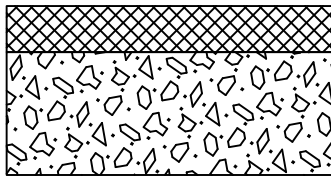


← 2.0" ACHM SURFACE COURSE (ARDOT 12.5 mm or 9.5 mm)

← 6.0" CRUSHED STONE BASE (ARDOT CLASS 7)

### LIGHT TRAFFIC FLEXIBLE PAVEMENT STRUCTURE

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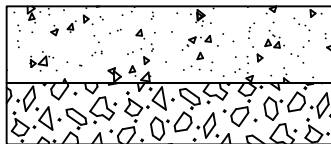


← 3.0" ACHM SURFACE COURSE (ARDOT 12.5 mm or 9.5 mm)

← 8.0" CRUSHED STONE BASE (ARDOT CLASS 7)

### HEAVY TRAFFIC FLEXIBLE PAVEMENT STRUCTURE

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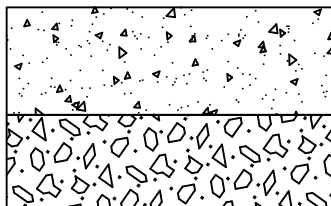


← 5.0" CONCRETE ( $f_c = 4000$  psi)

← 4.0" CRUSHED STONE BASE (ARDOT CLASS 7)

### LIGHT TRAFFIC RIGID PAVEMENT STRUCTURE

---



← 7.0" CONCRETE ( $f_c = 4000$  psi)

← 6.0" CRUSHED STONE BASE (ARDOT CLASS 7)

### HEAVY TRAFFIC RIGID PAVEMENT STRUCTURE

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#### NOTES:

1. Subgrade preparation per text of Geotechnical Report.
2. Class 7 Base should be 90% crushed stone meeting ARDOT Table 303-1.
3. Class 7 Base should be compacted to not less than 98% Modified (ASTM D1557) Compaction.
4. Compaction of the ACHM surface course shall not be less than 92% of the theoretical mix design and not less than 90% in any joint.
5. Portland Cement Concrete (PCC) strength to be 4000 psi at 28 days with 5% air entrainment.
6. PCC load transfer, dowels, and joints per ACI, ARDOT, or PCA guidelines.
7. PCC should be increased to 10.0 inches for dumpster approaches and pads.

APPENDIX B  
SUPPORTING LABORATORY DATA

**MOISTURE CONTENT DETERMINATION  
ASTM D 2216**

**Project:** BROOKLAND CITY HALL AND POLICE DEPARTMENT **Project No.:** 17332  
**Location:** BROOKLAND, ARKANSAS **Date:** 06/30/23

**MOISTURE CONTENT**

Sample Number	B1;P1	B1;P2	B1;P3	B1;P4	P1;P1	P1;P2	P1;P3
Tare Number	F14	AXA	F12	773	E	III	210
Tare + Wet Soil (g)	172.32	169.90	165.71	184.52	168.85	146.66	163.99
Tare + Dry Soil (g)	145.48	137.27	132.65	145.08	136.96	120.24	134.25
Tare (g)	11.13	10.64	11.15	10.42	11.23	11.81	11.56
Water (g)	26.84	32.63	33.06	39.44	31.89	26.42	29.74
Dry Soil (g)	134.35	126.63	121.50	134.66	125.73	108.43	122.69
Water Content (%)	<b>19.98</b>	<b>25.77</b>	<b>27.21</b>	<b>29.29</b>	<b>25.36</b>	<b>24.37</b>	<b>24.24</b>

**MOISTURE CONTENT**

Sample Number	P1;P4
Tare Number	CJ
Tare + Wet Soil (g)	160.44
Tare + Dry Soil (g)	131.45
Tare (g)	11.67
Water (g)	28.99
Dry Soil (g)	119.78
Water Content (%)	<b>24.20</b>

**ATTERBERG LIMIT DETERMINATION  
ASTM D 4318**

**Project:** BROOKLAND CITY HALL AND POLICE DEPARTMENT  
**Location:** BROOKLAND, ARKANSAS

**Project No.:** 17332  
**Date:** 07/03/23

**LIQUID LIMIT**

Sample Number	B1;P1	B1;P7	B2;P3	B3;P2	P2;P1	
Tare Number	17	NON - PLASTIC	60	25	42X	
Number of Blows	25		27	24	24	
Tare + Wet Soil (g)	34.71		36.31	21.60	27.60	
Tare + Dry Soil (g)	28.68		27.16	17.28	21.31	
Tare (g)	7.91		7.60	8.21	6.80	
Water (g)	6.03		9.15	4.32	6.29	
Dry Soil (g)	20.77		19.56	9.07	14.51	
Water Content (%)	29.03		46.78	47.63	43.35	
Liquid Limit	29		NP	47	47	43

**PLASTIC LIMIT**

Sample Number	B1;P1	B1;P7	B2;P3	B3;P2	P2;P1
Tare Number	41	NON - PLASTIC	97	KNL	MC
Tare + Wet Soil (g)	24.39		19.16	18.85	17.65
Tare + Dry Soil (g)	21.60		17.61	17.32	16.15
Tare (g)	8.10		8.24	8.76	7.85
Water (g)	2.79		1.55	1.53	1.50
Dry Soil (g)	13.50		9.37	8.56	8.30
Water Content (%)	20.67		16.54	17.87	18.07
Plastic Limit	21		17	18	18
Plasticity Index	<b>8</b>		<b>30</b>	<b>29</b>	<b>25</b>
Classification (#40)	CL		NP	CL	CL

**MECHANICAL GRAIN SIZE ANALYSES**  
**ASTM D 1140**

**Project:** BROOKLAND CITY HALL AND POLICE DEPARTMENT **Project No.:** 17332  
**Location:** BROOKLAND, ARKANSAS **Date:** 07/03/23  
**Sample No.:** B1;P2 **Sample Depth:** 2.5'-4'  
**Soil Description:** GRAY & BROWN LEAN CLAY

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	23.3	23.3	5.0	95.0
PAN	444.0	467.3	100.0	0.0

**Percent Sample Gravel/Sand:** 5.0 **Sample Weight:** 467.3  
**Percent Sample Silt/Clay:** 95.0 **Washing Loss:** 444.0g

**Project:** BROOKLAND CITY HALL AND POLICE DEPARTMENT **Project No.:** 17332  
**Location:** BROOKLAND, ARKANSAS **Date:** 07/03/23  
**Sample No.:** B1;P5 **Sample Depth:** 10'-11.5'  
**Soil Description:** GRAY & REDDISH BROWN LEAN CLAY W/ SAND

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	112.0	112.0	25.0	75.0
PAN	335.5	447.5	100.0	0.0

**Percent Sample Gravel/Sand:** 25.0 **Sample Weight:** 447.5  
**Percent Sample Silt/Clay:** 75.0 **Washing Loss:** 335.5g

**MECHANICAL GRAIN SIZE ANALYSES**  
**ASTM D 1140**

**Project:** BROOKLAND CITY HALL AND POLICE DEPARTMENT  
**Location:** BROOKLAND, ARKANSAS  
**Sample No.:** B3;P1  
**Soil Description:** GRAY & BROWN LEAN CLAY

**Project No.:** 17332  
**Date:** 07/03/23  
**Sample Depth:** 0'-1.5'

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	9.4	9.4	2.4	97.6
PAN	385.2	394.6	100.0	0.0
<b>Percent Sample Gravel/Sand:</b> 2.4			<b>Sample Weight:</b> 394.6	
<b>Percent Sample Silt/Clay:</b> 97.6			<b>Washing Loss:</b> 385.2g	

**SECTION 00 41 00  
BID FORM**

**THE PROJECT AND THE PARTIES**

**1.01 TO:**

- A. City of Brookland (Owner)  
County Road 760  
Brookland, Arkansas 72417

**1.02 FOR:**

- A. Project: Brookland Municipal Center
  - 1. Architect's Project Number: 2224
  - 2. City Contract Number: To be determined  
County Road 760  
Brookland, Arkansas 72417

**1.03 DATE: \_\_\_\_\_ (BIDDER TO ENTER DATE)**

**1.04 SUBMITTED BY: (BIDDER TO ENTER NAME AND ADDRESS)**

- A. Bidder's Full Name \_\_\_\_\_
  - 1. Address \_\_\_\_\_
  - 2. City, State, Zip \_\_\_\_\_
  - 3. Contractor's License Number: \_\_\_\_\_

**1.05 OFFER**

- A. Having examined the Place of The Work and all matters referred to in the Instructions to Bidders and the Bid Documents prepared by Cooper Mixon Architects PLLC for the above mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Sum of:
- B. \_\_\_\_\_ dollars  
(\$ \_\_\_\_\_), in lawful money of the United States of America.
- C. We have included the required security Bid Bond as required by the Instruction to Bidders.
- D. We have included the required performance assurance bonds in the Bid Amount as required by the Instructions to Bidders.
- E. We have included the required Maintenance Bond required following the Supplementary Conditions.
- F. All applicable federal taxes are included and State of Arkansas taxes are included in the Bid Sum.
- G. All Cash and Contingency Allowances described in Section 01 21 00 - Allowances are included in the Bid Sum.

**1.06 ACCEPTANCE**

- A. This offer shall be open to acceptance and is irrevocable for sixty days from the bid closing date.
- B. If this bid is accepted by Owner within the time period stated above, we will:
  - 1. Furnish the required bonds within ten days of receipt of Notice of Award.
  - 2. Commence work within ten days after written Notice to Proceed of this bid.

- C. If this bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required Bond(s), the security deposit shall be forfeited as damages to Owner by reason of our failure, limited in amount to the lesser of the face value of the security deposit or the difference between this bid and the bid upon which a Contract is signed.
- D. In the event our bid is not accepted within the time stated above, the required security deposit shall be returned to the undersigned, in accordance with the provisions of the Instructions to Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.
- E. Liquidated damages have no value when determining the lowest responsive and responsible Bidder.

**1.07 CONTRACT TIME**

- A. If this Bid is accepted, we will:
  - 1. Complete the Work in \_\_\_\_\_ calendar weeks from Notice to Proceed.

**1.08 LIQUIDATED DAMAGES**

- A. The amount of Liquidated Damages per Day to be assessed shall be in accordance with the schedule that follows:

<u>1. Amount of Contract</u>	<u>Liquidated Damages Per Day</u>
2. Less than \$25,000.00	\$100.00
3. Not less than \$25,000.00 but less than \$50,000.00	\$150.00
4. Not less than \$50,000.00 but less than \$100,000.00	\$200.00
5. Not less than \$100,000.00 but less than \$500,000.00	\$250.00
6. Not less than \$500,000.00 but less than \$1,000,000.00	\$350.00
7. Over \$1,000,000.00	\$500.00

**1.09 UNIT PRICES TO BE INCLUDED IN BASE PROPOSAL**

- A. The following are Unit Prices for specific portions of the Work as listed. The Undersigned agrees that the following UNIT PRICES shall govern changes in the Work, whether they be ADDITIONS or DEDUCTIONS to the Contract Sum required during the course of the Work. Unit Prices shall be the same for Additions or Deductions. All Unit Prices shall be total installed costs including overhead, profit, geotechnical engineering and all other necessary costs. Proposing separated add and deduct unit prices shall subject this Bid Proposal to be rejected as "non-responsive."The following is the list of Unit Prices:

- B. ITEM DESCRIPTION - UNIT QUANTITY - UNIT PRICE - ITEM VALUE

- 1. Price per cu.yd. for undercut and backfill: - Qty - Unit Price - \$ \_\_\_\_\_

**1.10 UNIT PRICES NOT INCLUDED IN THE BASE PROPOSAL**

- A. Unit Prices **NOT** included in the Base Proposal. Unit prices shall include overhead, profit, and all other costs to complete the work.
  - 1. Unit Price for Alternate Flooring Adhesive in the event such remediation is required. Refer to Section 09 05 61 Common Work Results for Flooring Preparation:
    - a. Total square foot of area \_\_\_\_\_ area sq. ft.
    - b. Allowance for Adhesive per square foot \$ \_\_\_\_\_.

**Total Amount \$ \_\_\_\_\_**  
(sq. ft. times price per sq. ft.)
  - 2. Unit Price for Remedial Floor Coating in the event such remediation is required. Refer to Section 09 05 61 Common Work Results for Flooring Preparation:
    - a. Total square foot of area \_\_\_\_\_ area sq. ft.
    - b. Allowance for Remedial Coating per square foot \$ \_\_\_\_\_.



**Total Amount \$** \_\_\_\_\_  
(sq. ft. times price per sq. ft.)

3. Unit Price for Undercutting in the event such remediation is required.
  - a. Allowance for Undercutting per cubic yard \$ \_\_\_\_\_.

**1.11 ALLOWANCES INCLUDED IN THE BASE PROPOSAL**

- A. Special Inspections Allowance: Include the stipulated sum listed below for engaging the independent special inspection agency and the required special inspections and testing as directed by the Architect.
  1. \$10,000.00
- B. Undercutting Allowance: The contractor shall include in the base bid contract amount an allowance for undercutting of existing unsuitable material and replacement with suitable fill material at the above contract unit price for following:
  1. 300 CY at the unit price indicated in the paragraph above.
    - a. \$ \_\_\_\_\_

**1.12 ADDENDA**

- A. The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.
  1. Addendum # \_\_\_\_\_ Dated \_\_\_\_\_.
  2. Addendum # \_\_\_\_\_ Dated \_\_\_\_\_.

**1.13 BID FORM SUPPLEMENTS**

- A. The following information is included with Bid submission:
  1. Subcontractors: Mechanical Work - HVAC (indicative of heating, air conditioning, and ventilating) , Electrical Work (indicative of wiring and illuminating fixtures), and any other associated subcontractors working on the project.
  2. I submit the names of the following subcontractors we propose to use, and their State contractor License Numbers. (Indicate "none" if subcontractor is not required for this project. Include Prime Bidder's name and license number if Prime Bidder is doing this work itself and the Prime Bidder's contractor license is qualified for this specialty.)
    - a. MECHANICAL WORK - HVAC
      - 1) Name: \_\_\_\_\_
      - 2) License # \_\_\_\_\_
    - b. PLUMBING WORK
      - 1) Name: \_\_\_\_\_
      - 2) License # \_\_\_\_\_
    - c. ELECTRICAL WORK
      - 1) Name: \_\_\_\_\_
      - 2) License # \_\_\_\_\_
    - d. ROOFING AND SHEET METAL WORK
      - 1) Name: \_\_\_\_\_
      - 2) License # \_\_\_\_\_
- B. The following Supplements are to be attached by the Bidder to this Bid Form and are considered an integral part of this Bid Form:
  1. The Anti-Collusion Certification (following 00 41 00 BID FORM) must be executed and submitted with the bids at the time proposals are submitted.
  2. Suspension and Debarment Certification (following 00 41 00 BID FORM) must be executed and submitted with the bids at the time proposals are submitted.

3. STATEMENT OF BIDDER'S QUALIFICATIONS: Each Bidder shall submit on the form furnished for that purpose (following 00 41 00 BID FORM) , a statement of the Bidder's qualifications, his experience record in construction of work similar to that which here is involved, and his organization and equipment available for the work contemplated; and when specifically requested by the Owner, the Bidder shall provide a detailed financial statement. The Owner shall have the right to take such steps as it deems necessary to determine the ability of the Bidder to perform his obligations under the Contract, and the Bidder shall furnish the Owner all such information and data for this purpose as it may request. The right is reserved to reject any bid where an investigation of the available evidence or information does not satisfy the Owner that the Bidder is qualified to carry out properly the terms of the Contract.

#### 1.14 FURTHER CONDITIONS

- A. The undersigned, by submitting this Bid, further agrees:
1. To accept the provisions of the "INSTRUCTIONS TO BIDDERS."
  2. That Bidder understands that the Work must comply with accessibility laws and will ensure that the Work is built in strict accordance with the Contract Documents (Drawings, Plans, and Specifications), of which this Proposal is made a part.
  3. To accomplish the Work, including products, equipment, and systems; complete and functional; ready for operation.
  4. To allow any Federal, State or Local inspector, acting in their official capacity, access to the project site.
  5. That Bidder or subcontractor will not employ or contract with any illegal immigrants.
  6. That it is understood that the Owner may reject any or all bids and waive any informalities or irregularities.

#### 1.15 ATTACHMENTS

- A.  Bid Security.  
B.  Power of Attorney for Bid Bond for the Bid Security.

#### 1.16 BID FORM SIGNATURE(S)

The Corporate Seal of

\_\_\_\_\_

(Bidder - print the full name of your firm)

was hereunto affixed in the presence of:

\_\_\_\_\_

(Authorized signing officer, Title)

(Seal)

\_\_\_\_\_

(Authorized signing officer, Title)

- 1.17 IF THE BID IS A JOINT VENTURE OR PARTNERSHIP, ADD ADDITIONAL FORMS OF EXECUTION FOR EACH MEMBER OF THE JOINT VENTURE IN THE APPROPRIATE FORM OR FORMS AS ABOVE.

END OF SECTION

**SECTION 00 50 00  
CONTRACTING FORMS AND SUPPLEMENTS**

**PART 1 GENERAL**

**1.01 CONTRACTOR IS RESPONSIBLE FOR OBTAINING A VALID LICENSE TO USE ALL  
COPYRIGHTED DOCUMENTS SPECIFIED BUT NOT INCLUDED IN THE PROJECT MANUAL.**

**1.02 AGREEMENT AND CONDITIONS OF THE CONTRACT**

- A. See Section 00 52 00 - Agreement Form for the Agreement form to be executed.
- B. See Section 00 72 00 - General Conditions for the General Conditions.
- C. The Agreement is based on AIA A101.
- D. The General Conditions are based on AIA A201.

**1.03 FORMS**

- A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in Contract Documents.
- B. Bond Forms:
  - 1. Bid Bond Form: AIA A310.
  - 2. Performance and Payment Bond Form: AIA A312.
- C. Post-Award Certificates and Other Forms:
  - 1. Submittal Transmittal Letter Form: AIA G810.
  - 2. Schedule of Values Form: AIA G703.
  - 3. Application for Payment Forms: AIA G702 with AIA G703 (for Contractors).
- D. Clarification and Modification Forms:
  - 1. Substitution Request Form: Section 01 25 10 Substitution Request Form, following Substitution Procedures.
  - 2. Architect's Supplemental Instructions Form: AIA G710.
  - 3. Construction Change Directive Form: AIA G714.
  - 4. Change Order Form: AIA G701.
- E. Closeout Forms:
  - 1. Certificate of Substantial Completion Form: AIA G704.

**1.04 REFERENCE STANDARDS**

- A. AIA A101 - Standard Form of Agreement Between Owner and Contractor where the basis of Payment is a Stipulated Sum; 2017.
- B. AIA A201 - General Conditions of the Contract for Construction; 2017.
- C. AIA A310 - Bid Bond; 2010.
- D. AIA A312 - Performance Bond and Payment Bond; 2010.
- E. AIA G701 - Change Order; 2017.
- F. AIA G702 - Application and Certificate for Payment; 1992.
- G. AIA G703 - Continuation Sheet; 1992.
- H. AIA G704 - Certificate of Substantial Completion; 2017.
- I. AIA G710 - Architect's Supplemental Instructions; 2017.
- J. AIA G714 - Construction Change Directive; 2017.

K. AIA G810 - Transmittal Letter; 2001.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 00 52 00  
AGREEMENT FORM**

**PART 1 GENERAL**

**1.01 FORM OF AGREEMENT**

- A. The Agreement to be executed is attached following this page.

**1.02 RELATED REQUIREMENTS**

- A. Section 00 72 00 - General Conditions.  
B. Section 00 73 00 - Supplementary Conditions.  
C. Section 01 42 16 - Definitions.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

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**SECTION 00 72 00  
GENERAL CONDITIONS**

**FORM OF GENERAL CONDITIONS**

**1.01 THE GENERAL CONDITIONS APPLICABLE TO THIS CONTRACT IS ATTACHED FOLLOWING THIS PAGE.**

**1.02 RELATED REQUIREMENTS**

- A. SECTION 00 73 00 - Supplementary Conditions.
- B. SECTION 01 42 16 - Definitions.

**1.03 SUPPLEMENTARY CONDITIONS**

- A. REFER TO DOCUMENT 00 73 00 - Supplementary Conditions FOR AMENDMENTS TO THESE GENERAL CONDITIONS.

**END OF SECTION**

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# DRAFT AIA® Document A101® - 2017

## *Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum*

**AGREEMENT** made as of the « » day of « » in the year « »  
(In words, indicate day, month and year.)

**BETWEEN** the Owner:  
(Name, legal status, address and other information)

«City of Brookland, Arkansas»« , Other»  
«613 Holman  
Brookland, AR 72417»  
«Telephone Number: (870) 931-6221»  
«»

and the Contractor:  
(Name, legal status, address and other information)

« »« »  
« »  
« »  
« »

for the following Project:  
(Name, location and detailed description)

«Brookland Municipal Center»  
«Brookland, Arkansas»  
«The project consists of the new construction of a Municipal Center for the City of Brookland, Arkansas.»

The Architect:  
(Name, legal status, address and other information)

«Cooper Mixon Architects PLLC»« , Professional Limited Liability Company»  
«505 Union Street  
2nd Floor»  
«Telephone Number: (870) 336-0536»  
«»

The Owner and Contractor agree as follows.

**ADDITIONS AND DELETIONS:** The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101®-2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®-2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

**ELECTRONIC COPYING** of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

**TABLE OF ARTICLES**

- 1 THE CONTRACT DOCUMENTS**
- 2 THE WORK OF THIS CONTRACT**
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION**
- 4 CONTRACT SUM**
- 5 PAYMENTS**
- 6 DISPUTE RESOLUTION**
- 7 TERMINATION OR SUSPENSION**
- 8 MISCELLANEOUS PROVISIONS**
- 9 ENUMERATION OF CONTRACT DOCUMENTS**

**EXHIBIT A INSURANCE AND BONDS**

**ARTICLE 1 THE CONTRACT DOCUMENTS**

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

**ARTICLE 2 THE WORK OF THIS CONTRACT**

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

**ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION**

**§ 3.1** The date of commencement of the Work shall be:

*(Check one of the following boxes.)*

- « X »** The date of this Agreement.
- « »** A date set forth in a notice to proceed issued by the Owner.
- « »** Established as follows:  
*(Insert a date or a means to determine the date of commencement of the Work.)*  
 **« »**

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

**§ 3.2** The Contract Time shall be measured from the date of commencement of the Work.

**§ 3.3 Substantial Completion**

**§ 3.3.1** Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

*(Check one of the following boxes and complete the necessary information.)*

[ « » ] Not later than « » ( « » ) calendar days from the date of commencement of the Work.

[ « X » ] By the following date: «Date of Substantial Completion will be calculated as the agreed upon number of days from the Notice to Proceed.»

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date
<u>Not Applicable</u>	

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

#### ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « determined by competitive bid process » (\$ « » ), subject to additions and deductions as provided in the Contract Documents.

#### § 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price
<u>Not Applicable</u>	

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement. (Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance
<u>Not Applicable</u>		

§ 4.3 Allowances, if any, included in the Contract Sum: (Identify each allowance.)

Item	Price
<u>-Special Inspections</u> <u>Undercut and Backfill</u> <u>Other Allowances</u>	<u>Per Specification</u> <u>To be Determined</u> <u>Listed in Specification and/or Bid Form</u>

§ 4.4 Unit prices, if any:

(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)
<u>Undercut and Backfill</u> <u>Other Unit Prices</u>	<u>Cubic Yard</u> <u>As Specified</u>	<u>To be Determined</u>

§ 4.5 Liquidated damages, if any:

(Insert terms and conditions for liquidated damages, if any.)

« »

§ 4.6 Other:

(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

## ARTICLE 5 PAYMENTS

### § 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the « twenty-fifth » day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the « tenth » day of the « following » month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than « thirty » ( « 30 » ) days after the Architect receives the Application for Payment.

*(Federal, state or local laws may require payment within a certain period of time.)*

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

### § 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

*(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)*

« Five Percent 5% »

§ 5.1.7.1.1 The following items are not subject to retainage:

*(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)*

« General Conditions, Insurance »

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:

*(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)*

« Not Applicable »

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:

*(Insert any other conditions for release of retainage upon Substantial Completion.)*

« Retainage will be withheld in the amount equal to work left to complete at the date of substantial completion, as determined by the architect. »

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

## § 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

« Provided final certificate of payment is accompanied with all the closeout and final documents as required by the specification. »

## § 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

*(Insert rate of interest agreed upon, if any.)*

« % » « Legal rate prevailing from time to time at the place where the Project is located. »

## ARTICLE 6 DISPUTE RESOLUTION

### § 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.

*(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)*

« The Architect will serve as the initial Decision Maker pursuant to Article 15 of AIA Document A201-2017. »

« »  
« »  
« »

## § 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:

*(Check the appropriate box.)*

Arbitration pursuant to Section 15.4 of AIA Document A201–2017

Litigation in a court of competent jurisdiction

Other *(Specify)*

« »

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

## ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner’s convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:

*(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner’s convenience.)*

« Not Applicable »

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

## ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner’s representative:

*(Name, address, email address, and other information)*

«Kenneth Jones»

«613 Holman

Brookland, AR 72417»

«Telephone Number: (870) 931-6221»

«»

«»

«Email Address: cityofbrookland@yahoo.com»

§ 8.3 The Contractor’s representative:

*(Name, address, email address, and other information)*

« »

« »

<< >>  
<< >>  
<< >>  
<< >>

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™-2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™-2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201-2017, may be given in accordance with AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

*(If other than in accordance with AIA Document E203-2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)*

<< Not Applicable >>

§ 8.7 Other provisions:

<< Not Applicable >>

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™-2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™-2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™-2017, General Conditions of the Contract for Construction
- .4 AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:

*(Insert the date of the E203-2013 incorporated into this Agreement.)*

<< Not Applicable >>

- .5 Drawings

Number	Title	Date

- .6 Specifications

Section	Title	Date	Pages

- .7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

**.8 Other Exhibits:**  
*(Check all boxes that apply and include appropriate information identifying the exhibit where required.)*

[  ] AIA Document E204™-2017, Sustainable Projects Exhibit, dated as indicated below:  
*(Insert the date of the E204-2017 incorporated into this Agreement.)*

« »

[  ] The Sustainability Plan:

Title	Date	Pages

[  ] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

**.9 Other documents, if any, listed below:**  
*(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™-2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)*

« »

This Agreement entered into as of the day and year first written above.

\_\_\_\_\_  
**OWNER** *(Signature)*

«Kenneth Jones»«», Mayor»

*(Printed name and title)*

\_\_\_\_\_  
**CONTRACTOR** *(Signature)*

« »« »

*(Printed name and title)*



# DRAFT AIA® Document A101® – 2017

## Exhibit A

### *Insurance and Bonds*

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the « » day of « » in the year « »  
(In words, indicate day, month and year.)

for the following **PROJECT**:  
(Name and location or address)

«Brookland Municipal Center»  
«Brookland, Arkansas»

**THE OWNER:**  
(Name, legal status and address)

«City of Brookland, Arkansas»« , Other»  
«613 Holman  
Brookland, AR 72417»

**THE CONTRACTOR:**  
(Name, legal status and address)

« »« »  
« »

#### TABLE OF ARTICLES

- A.1 GENERAL
- A.2 OWNER'S INSURANCE
- A.3 CONTRACTOR'S INSURANCE AND BONDS
- A.4 SPECIAL TERMS AND CONDITIONS

#### ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201™–2017, General Conditions of the Contract for Construction.

#### ARTICLE A.2 OWNER'S INSURANCE

##### § A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

##### § A.2.2 Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

**ADDITIONS AND DELETIONS:** The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Document A201®–2017, General Conditions of the Contract for Construction. Article 11 of A201®–2017 contains additional insurance provisions.

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**§ A.2.3 Required Property Insurance**

**§ A.2.3.1** Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

**§ A.2.3.1.1 Causes of Loss.** The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sub-limits, if any, are as follows:

*(Indicate below the cause of loss and any applicable sub-limit.)*

Causes of Loss	Sub-Limit

**§ A.2.3.1.2 Specific Required Coverages.** The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows:

*(Indicate below type of coverage and any applicable sub-limit for specific required coverages.)*

Coverage	Sub-Limit

**§ A.2.3.1.3** Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

**§ A.2.3.1.4 Deductibles and Self-Insured Retentions.** If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

**§ A.2.3.2 Occupancy or Use Prior to Substantial Completion.** The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

**§ A.2.3.3 Insurance for Existing Structures**

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

**§ A.2.4 Optional Extended Property Insurance.**

The Owner shall purchase and maintain the insurance selected and described below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

[  ] **§ A.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance**, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.

[  ] **§ A.2.4.2 Ordinance or Law Insurance**, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.

[  ] **§ A.2.4.3 Expediting Cost Insurance**, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.

[  ] **§ A.2.4.4 Extra Expense Insurance**, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.

[  ] **§ A.2.4.5 Civil Authority Insurance**, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.

[  ] **§ A.2.4.6 Ingress/Egress Insurance**, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.

[  ] **§ A.2.4.7 Soft Costs Insurance**, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.

### § A.2.5 Other Optional Insurance.

The Owner shall purchase and maintain the insurance selected below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

[ « » ] § A.2.5.1 **Cyber Security Insurance** for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information. *(Indicate applicable limits of coverage or other conditions in the fill point below.)*

« »

[ « » ] § A.2.5.2 **Other Insurance**  
*(List below any other insurance coverage to be provided by the Owner and any applicable limits.)*

Coverage	Limits
----------	--------

## ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

### § A.3.1 General

§ A.3.1.1 **Certificates of Insurance.** The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.2 **Deductibles and Self-Insured Retentions.** The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 **Additional Insured Obligations.** To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

### § A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:  
*(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)*

« »

### § A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than « One Million Dollars » (\$ « 1,000,000.00 ») each occurrence, « Two Million Dollars » (\$ « 2,000,000.00 ») general aggregate, and « Two Million Dollars » (\$ « 2,000,000.00 ») aggregate for products-completed operations hazard, providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- .2 personal injury and advertising injury;
- .3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;

- .4 bodily injury or property damage arising out of completed operations; and
- .5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- .1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
- .2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
- .3 Claims for bodily injury other than to employees of the insured.
- .4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
- .5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- .6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- .7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- .8 Claims related to roofing, if the Work involves roofing.
- .9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
- .10 Claims related to earth subsidence or movement, where the Work involves such hazards.
- .11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than « » (\$ « ») per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than « One Million Dollars » (\$ « 1,000,000.00 ») each accident, « One Million Dollars » (\$ « 1,000,000.00 ») each employee, and « Two Million Dollars » (\$ « 2,000,000.00 ») policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than « One Million Dollars » (\$ « 1,000,000.00 ») per claim and « Two Million Dollars » (\$ « 2,000,000.00 ») in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than « » (\$ « ») per claim and « » (\$ « ») in the aggregate.

§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than « » (\$ « ») per claim and « » (\$ « ») in the aggregate.

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than « » (\$ « ») per claim and « » (\$ « ») in the aggregate.

§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than « » (\$ « ») per claim and « » (\$ « ») in the aggregate.

**§ A.3.3 Contractor's Other Insurance Coverage**

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

*(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)*

« »

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.

*(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)*

- [  ] § A.3.3.2.1 Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below:
- (Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)*

« »

- [  ] § A.3.3.2.2 **Railroad Protective Liability Insurance**, with policy limits of not less than « » (\$ « ») per claim and « » (\$ « ») in the aggregate, for Work within fifty (50) feet of railroad property.

- [  ] § A.3.3.2.3 **Asbestos Abatement Liability Insurance**, with policy limits of not less than « » (\$ « ») per claim and « » (\$ « ») in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.

- [  ] § A.3.3.2.4 Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.

- [  ] § A.3.3.2.5 Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

- [  ] § A.3.3.2.6 **Other Insurance**  
*(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)*

**Coverage**

**Limits**

**§ A.3.4 Performance Bond and Payment Bond**

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:

*(Specify type and penal sum of bonds.)*

Type

Penal Sum (\$0.00)

Payment Bond

100% of Contract Amount

Performance Bond

100% of Contract Amount

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

**ARTICLE A.4 SPECIAL TERMS AND CONDITIONS**

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

<< >>

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**SECTION 00 73 00  
SUPPLEMENTARY CONDITIONS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. These Supplementary Conditions amend and supplement the General Conditions defined in Document 00 72 00 - General Conditions and other provisions of Contract Documents as indicated below. Provisions that are not so amended or supplemented remain in full force and effect.
- B. The terms used in these Supplementary Conditions that are defined in the General Conditions have the meanings assigned to them in the General Conditions.

**1.02 RELATED SECTIONS**

- A. Section 00 50 00 - Contracting Forms and Supplements.
- B. Section 01 42 16 - Definitions.

**1.03 MODIFICATIONS TO GENERAL CONDITIONS**

- A. Documents attached following this page.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

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# AIA® Document A201® – 2017

## General Conditions of the Contract for Construction

**for the following PROJECT:**

*(Name and location or address)*

Brookland Municipal Center  
Brookland, Arkansas

**THE OWNER:**

*(Name, legal status and address)*

City of Brookland, Arkansas, Other  
613 Holman  
Brookland, AR 72417

**THE ARCHITECT:**

*(Name, legal status and address)*

Cooper Mixon Architects PLLC, Professional Limited Liability Company  
505 Union Street  
2nd Floor  
Jonesboro, AR 72401

**TABLE OF ARTICLES**

- 1      **GENERAL PROVISIONS**
- 2      **OWNER**
- 3      **CONTRACTOR**
- 4      **ARCHITECT**
- 5      **SUBCONTRACTORS**
- 6      **CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**
- 7      **CHANGES IN THE WORK**
- 8      **TIME**
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- 10     **PROTECTION OF PERSONS AND PROPERTY**
- 11     **INSURANCE AND BONDS**
- 12     **UNCOVERING AND CORRECTION OF WORK**
- 13     **MISCELLANEOUS PROVISIONS**

**ADDITIONS AND DELETIONS:**

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

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14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES



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## **ARTICLE 1 GENERAL PROVISIONS**

### **§ 1.1 Basic Definitions**

#### **§ 1.1.1 The Contract Documents**

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

#### **§ 1.1.2 The Contract**

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

#### **§ 1.1.3 The Work**

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

#### **§ 1.1.4 The Project**

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

#### **§ 1.1.5 The Drawings**

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

#### **§ 1.1.6 The Specifications**

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

#### **§ 1.1.7 Instruments of Service**

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

#### **§ 1.1.8 Initial Decision Maker**

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

### **§ 1.2 Correlation and Intent of the Contract Documents**

**§ 1.2.1** The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

### § 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

### § 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

### § 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

### § 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

### § 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

### § 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document

G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

## **ARTICLE 2 OWNER**

### **§ 2.1 General**

**§ 2.1.1** The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

**§ 2.1.2** The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

### **§ 2.2 Evidence of the Owner's Financial Arrangements**

**§ 2.2.1** Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

**§ 2.2.2** Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

**§ 2.2.3** After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

**§ 2.2.4** Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

### **§ 2.3 Information and Services Required of the Owner**

**§ 2.3.1** Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

**§ 2.3.2** The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

#### § 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

#### § 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

### ARTICLE 3 CONTRACTOR

#### § 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

#### § 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

**§ 3.2.2** Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

**§ 3.2.3** The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

**§ 3.2.4** If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

### **§ 3.3 Supervision and Construction Procedures**

**§ 3.3.1** The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

**§ 3.3.2** The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

**§ 3.3.3** The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

### **§ 3.4 Labor and Materials**

**§ 3.4.1** Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

**§ 3.4.2** Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.



§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

### § 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

### § 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

### § 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

### § 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

### **§ 3.8 Allowances**

**§ 3.8.1** The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

**§ 3.8.2** Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

**§ 3.8.3** Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

### **§ 3.9 Superintendent**

**§ 3.9.1** The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

**§ 3.9.2** The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

**§ 3.9.3** The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

### **§ 3.10 Contractor's Construction and Submittal Schedules**

**§ 3.10.1** The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

**§ 3.10.2** The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

**§ 3.10.3** The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

### **§ 3.11 Documents and Samples at the Site**

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and

delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

**§ 3.12 Shop Drawings, Product Data and Samples**

**§ 3.12.1** Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

**§ 3.12.2** Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

**§ 3.12.3** Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

**§ 3.12.4** Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

**§ 3.12.5** The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

**§ 3.12.6** By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

**§ 3.12.7** The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

**§ 3.12.8** The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

**§ 3.12.9** The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

**§ 3.12.10** The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

**§ 3.12.10.1** If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will

specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

**§ 3.12.10.2** If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

### **§ 3.13 Use of Site**

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

### **§ 3.14 Cutting and Patching**

**§ 3.14.1** The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

**§ 3.14.2** The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

### **§ 3.15 Cleaning Up**

**§ 3.15.1** The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

**§ 3.15.2** If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

### **§ 3.16 Access to Work**

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

### **§ 3.17 Royalties, Patents and Copyrights**

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

### **§ 3.18 Indemnification**

**§ 3.18.1** To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

**§ 3.18.2** In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

## **ARTICLE 4 ARCHITECT**

### **§ 4.1 General**

**§ 4.1.1** The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

**§ 4.1.2** Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

### **§ 4.2 Administration of the Contract**

**§ 4.2.1** The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

**§ 4.2.2** The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

**§ 4.2.3** On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

### **§ 4.2.4 Communications**

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

## ARTICLE 5 SUBCONTRACTORS

### § 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

### § 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

### § 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

### § 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

## **ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**

### **§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts**

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

### **§ 6.2 Mutual Responsibility**

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.



§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

### § 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

## ARTICLE 7 CHANGES IN THE WORK

### § 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

### § 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

### § 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

#### § 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

### ARTICLE 8 TIME

#### § 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

## § 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

## § 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

## ARTICLE 9 PAYMENTS AND COMPLETION

### § 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

### § 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

### § 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

**§ 9.3.1.2** Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

**§ 9.3.2** Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

**§ 9.3.3** The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

#### **§ 9.4 Certificates for Payment**

**§ 9.4.1** The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

**§ 9.4.2** The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

#### **§ 9.5 Decisions to Withhold Certification**

**§ 9.5.1** The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;

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- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

## § 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

## **§ 9.7 Failure of Payment**

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

## **§ 9.8 Substantial Completion**

**§ 9.8.1** Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

**§ 9.8.2** When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

**§ 9.8.3** Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

**§ 9.8.4** When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

**§ 9.8.5** The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

## **§ 9.9 Partial Occupancy or Use**

**§ 9.9.1** The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

**§ 9.9.2** Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

### § 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

## ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

### § 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

### § 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

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- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

#### § 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

#### § 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will



promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

**§ 10.3.3** To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

**§ 10.3.4** The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

**§ 10.3.5** The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

**§ 10.3.6** If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

#### **§ 10.4 Emergencies**

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

### **ARTICLE 11 INSURANCE AND BONDS**

#### **§ 11.1 Contractor's Insurance and Bonds**

**§ 11.1.1** The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

**§ 11.1.2** The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

**§ 11.1.3** Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

**§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance.** Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act

or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

## § 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 **Failure to Purchase Required Property Insurance.** If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 **Notice of Cancellation or Expiration of Owner's Required Property Insurance.** Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

## § 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

## § 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

#### **§11.5 Adjustment and Settlement of Insured Loss**

**§ 11.5.1** A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

**§ 11.5.2** Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

### **ARTICLE 12 UNCOVERING AND CORRECTION OF WORK**

#### **§ 12.1 Uncovering of Work**

**§ 12.1.1** If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

**§ 12.1.2** If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

#### **§ 12.2 Correction of Work**

##### **§ 12.2.1 Before Substantial Completion**

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

##### **§ 12.2.2 After Substantial Completion**

**§ 12.2.2.1** In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

### § 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

## ARTICLE 13 MISCELLANEOUS PROVISIONS

### § 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

### § 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

### § 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

### § 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and

approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

### § 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

## ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

### § 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

#### § 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

#### § 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

#### § 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

## **ARTICLE 15 CLAIMS AND DISPUTES**

### **§ 15.1 Claims**

#### **§ 15.1.1 Definition**

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

#### **§ 15.1.2 Time Limits on Claims**

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

#### **§ 15.1.3 Notice of Claims**

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

#### **§ 15.1.4 Continuing Contract Performance**

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

#### **§ 15.1.5 Claims for Additional Cost**

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

#### **§ 15.1.6 Claims for Additional Time**

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

### § 15.1.7 Waiver of Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

### § 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.



§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

### § 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

### § 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

**§ 15.4.4 Consolidation or Joinder**

**§ 15.4.4.1** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

**§ 15.4.4.2** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

**§ 15.4.4.3** The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

**SECTION 01 10 00  
SUMMARY**

**PART 1 GENERAL**

**1.01 PROJECT**

- A. Project Name: Brookland Municipal Center
- B. Owner's Name: City of Brookland.
- C. Architect's Name: Cooper Mixon Architects, PLLC.
- D. The Project consists of the construction of the new construction of a Municipal Center with City Hall and Police Department for the City of Brookland, Arkansas as associated site improvements..

**1.02 CONTRACT DESCRIPTION**

- A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 52 00 - Agreement Form.

**1.03 DESCRIPTION OF ALTERATIONS WORK**

- A. Scope of demolition and removal work is indicated on drawings.

**1.04 WORK BY OWNER**

- A. Items noted NIC (Not in Contract) will be supplied and installed by Owner before Substantial Completion.

**1.05 OWNER OCCUPANCY**

- A. Owner intends to occupy the Project upon Substantial Completion.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

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**SECTION 01 20 00  
PRICE AND PAYMENT PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.

**1.02 RELATED REQUIREMENTS**

- A. Section 00 50 00 - Contracting Forms and Supplements: Forms to be used.
- B. Section 00 72 00 - General Conditions: Additional requirements for progress payments, final payment, changes in the Work.

**1.03 SCHEDULE OF VALUES**

- A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
- E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization.
- F. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
- G. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.
- H. Revise schedule to list approved Change Orders, with each Application For Payment.

**1.04 APPLICATIONS FOR PROGRESS PAYMENTS**

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- D. Forms filled out by hand will not be accepted.
- E. For each item, provide a column for listing each of the following:
  - 1. Item Number.
  - 2. Description of work.
  - 3. Scheduled Values.
  - 4. Previous Applications.
  - 5. Work in Place and Stored Materials under this Application.
  - 6. Authorized Change Orders.
  - 7. Total Completed and Stored to Date of Application.

8. Percentage of Completion.
  9. Balance to Finish.
  10. Retainage.
- F. Execute certification by signature of authorized officer.
- G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- I. Submit one electronic and three hard-copies of each Application for Payment.
- J. Include the following with the application:
1. Transmittal letter as specified for submittals in Section 01 30 00.
  2. Construction progress schedule, revised and current as specified in Section 01 30 00.
  3. Current construction photographs specified in Section 01 30 00.
  4. Partial release of liens from major subcontractors and vendors.
  5. Affidavits attesting to off-site stored products.
- K. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

#### **1.05 MODIFICATION PROCEDURES**

- A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to Contract Documents.
- B. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
- C. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
  2. Promptly execute the change.
- D. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 7 days.
- E. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01 6000.
- F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
  2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.

3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
  4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.
- G. Substantiation of Costs: Provide full information required for evaluation.
1. On request, provide the following data:
    - a. Quantities of products, labor, and equipment.
    - b. Taxes, insurance, and bonds.
    - c. Overhead and profit.
    - d. Justification for any change in Contract Time.
    - e. Credit for deletions from Contract, similarly documented.
  2. Support each claim for additional costs with additional information:
    - a. Origin and date of claim.
    - b. Dates and times work was performed, and by whom.
    - c. Time records and wage rates paid.
    - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
  3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- H. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- K. Promptly enter changes in Project Record Documents.

#### **1.06 APPLICATION FOR FINAL PAYMENT**

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
  1. All closeout procedures specified in Section 01 70 00.

#### **PART 2 PRODUCTS - NOT USED**

#### **PART 3 EXECUTION - NOT USED**

**END OF SECTION**

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**SECTION 01 21 00  
ALLOWANCES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Cash allowances.
- B. Inspecting and testing allowances.
- C. Payment and modification procedures relating to allowances.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 20 00 - Price and Payment Procedures: Additional payment and modification procedures.

**1.03 CASH ALLOWANCES**

- A. Costs Included in Cash Allowances: Cost of product to Contractor or subcontractor, less applicable trade discounts, less cost of delivery to site , less applicable taxes .
- B. Costs Not Included in Cash Allowances: Product delivery to site and handling at the site, including unloading, uncrating, and storage; protection of products from elements and from damage; and labor for installation and finishing.
- C. Architect Responsibilities:
  - 1. Consult with Contractor for consideration and selection of products, suppliers , and installers.
  - 2. Select products in consultation with Owner and transmit decision to Contractor.
  - 3. Prepare Change Order.
- D. Contractor Responsibilities:
  - 1. Assist Architect in selection of products, suppliers , and installers.
  - 2. Obtain proposals from suppliers and installers and offer recommendations.
  - 3. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
  - 4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
  - 5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
- E. Differences in costs will be adjusted by Change Order.

**1.04 INSPECTING AND TESTING ALLOWANCES**

- A. Costs Included in Inspecting and Testing Allowances: Cost of engaging an inspecting or testing agency; execution of inspecting and tests; and reporting results.
- B. Costs Not Included in the Inspecting and Testing Allowances:
  - 1. Costs of incidental labor and facilities required to assist inspecting or testing agency.
  - 2. Costs of testing services used by Contractor separate from Contract Document requirements.
  - 3. Costs of retesting upon failure of previous tests as determined by Architect.
- C. Payment Procedures:
  - 1. Submit one copy of the inspecting or testing firm's invoice with next application for payment.
  - 2. Pay invoice on approval by Architect.
- D. Differences in cost will be adjusted by Change Order.

**1.05 ALLOWANCES SCHEDULE**

- A. Inspecting and Testing Allowance: Include the sum defined on the BID FORM for payment of inspecting services specified in Section 01 40 00 - Quality Requirements.
- B. Undercut Allowance: Include the sum defined on the BID FORM.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01 22 00  
UNIT PRICES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. List of unit prices, for use in preparing Bids.
- B. Measurement and payment criteria applicable to Work performed under a unit price payment method.
- C. Defect assessment and non-payment for rejected work.

**1.02 RELATED REQUIREMENTS**

- A. Document 00 21 13 - Instructions to Bidders: Instructions for preparation of pricing for Unit Prices.
- B. Document 00 43 22 - Unit Prices Form: List of Unit Prices as supplement to Bid Form
- C. Section 01 20 00 - Price and Payment Procedures: Additional payment and modification procedures.

**1.03 COSTS INCLUDED**

- A. Unit Prices included on the Bid Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

**1.04 UNIT QUANTITIES SPECIFIED**

- A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.

**1.05 MEASUREMENT OF QUANTITIES**

- A. Measurement methods delineated in the individual specification sections complement the criteria of this section.
- B. Take all measurements and compute quantities. Measurements and quantities will be verified by Architect.
- C. Assist by providing necessary equipment, workers, and survey personnel as required.
- D. Measurement Devices:
  - 1. Weigh Scales: Inspected, tested and certified by the applicable state Weights and Measures department within the past year.
  - 2. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.
  - 3. Metering Devices: Inspected, tested and certified by the applicable state department within the past year.
- E. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
- F. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.
- G. Measurement by Area: Measured by square dimension using mean length and width or radius.
- H. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.
- I. Stipulated Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

- J. Perform surveys required to determine quantities, including control surveys to establish measurement reference lines. Notify Architect prior to starting work.
- K. Contractor's Engineer Responsibilities: Sign surveyor's field notes or keep duplicate field notes , calculate and certify quantities for payment purposes.

#### **1.06 PAYMENT**

- A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit price.
- B. Payment will not be made for any of the following:
  - 1. Products wasted or disposed of in a manner that is not acceptable.
  - 2. Products determined as unacceptable before or after placement.
  - 3. Products not completely unloaded from the transporting vehicle.
  - 4. Products placed beyond the lines and levels of the required Work.
  - 5. Products remaining on hand after completion of the Work.
  - 6. Loading, hauling, and disposing of rejected Products.

#### **1.07 DEFECT ASSESSMENT**

- A. Replace Work, or portions of the Work, not complying with specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct one of the following remedies:
  - 1. The defective Work may remain, but the unit price will be adjusted to a new unit price at the discretion of Architect.
  - 2. The defective Work will be partially repaired to the instructions of the Architect, and the unit price will be adjusted to a new unit price at the discretion of Architect.
- C. If, in the opinion of Owner, it is not practical to remove and replace the Work, Owner will direct one of the following remedies:
  - 1. The defective Work may remain, but the unit price will be adjusted to a new unit price at the discretion of Owner.
  - 2. The defective Work will be partially repaired to the instructions of the Owner, and the unit price will be adjusted to a new unit price at the discretion of Owner.
- D. The individual specification sections may modify these options or may identify a specific formula or percentage price reduction.
- E. The authority of Architect to assess the defect and identify payment adjustment is final.

#### **1.08 SCHEDULE OF UNIT PRICES**

- A. Unit prices shall be as indicated on the Bid Proposal Form.

#### **PART 2 PRODUCTS - NOT USED**

#### **PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01 25 00  
SUBSTITUTION PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Procedural requirements for proposed substitutions.

**1.02 RELATED REQUIREMENTS**

- A. Section 00 21 13 - Instructions to Bidders: Restrictions on timing of substitution requests.
- B. Section 01 25 10 - Substitution Request Form: Required form for substitution requests made prior to award (during procurement) or after award (during construction) of contract
- C. Section 01 30 00 - Administrative Requirements: Submittal procedures, coordination.
- D. Section 01 60 00 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

**1.03 DEFINITIONS**

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
  - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
    - a. Unavailability.
    - b. Regulatory changes.
  - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
    - a. Substitution requests offering advantages solely to the Contractor will not be considered.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 GENERAL REQUIREMENTS**

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
  - 2. Agrees to provide the same warranty for the substitution as for the specified product.
  - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
  - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
  - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
  - 6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- B. A Substitution Request for specified installer constitutes a representation that the submitter:
  - 1. Has acted in good faith to obtain services of specified installer, but was unable to come to commercial, or other terms.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.

1. Note explicitly any non-compliant characteristics.
- D. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
  1. Forms indicated in the Project Manual are adequate for this purpose, and must be used.
- E. Limit each request to a single proposed substitution item.
  1. Submit an electronic document, combining the request form with supporting data into single document.

### **3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT**

- A. Section 00 21 13 - Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period, and the documents required.
- B. Submittal Form (before award of contract):
  1. Submit substitution requests by completing the form attached to this section. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.

### **3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION**

- A. Submittal Form (after award of contract):
  1. Submit substitution requests by completing the form attached to this section. See this section for additional information and instructions. Use only this form; other forms of submission are unacceptable.
- B. Architect will consider requests for substitutions only within 15 days after date of Agreement.
- C. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- D. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
  1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
  2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
  3. Bear the costs engendered by proposed substitution of:
    - a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
    - b. Other construction by Owner.
    - c. Other unanticipated project considerations.
- E. Substitutions will not be considered under one or more of the following circumstances:
  1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
  2. Without a separate written request.
  3. When acceptance will require revisions to Contract Documents.

### **3.04 RESOLUTION**

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.

1. Architect's decision following review of proposed substitution will be noted on the submitted form.

**3.05 ACCEPTANCE**

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

**3.06 CLOSEOUT ACTIVITIES**

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
- B. Include completed Substitution Request Forms as part of the Project record. Include both approved and rejected Requests.

**3.07 ATTACHMENTS**

- A. A facsimile of the Substitution Request Form (During Construction) required to be used on the Project is included after this section.

**END OF SECTION**

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**SECTION 01 25 10  
SUBSTITUTION REQUEST FORM**

DATE: \_\_\_\_\_

PROJECT NAME: \_\_\_\_\_

Company Submitting Request (name and address):  
\_\_\_\_\_

Contact Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Email: \_\_\_\_\_

SPECIFIED ITEM (Section, Page, and Description):  
\_\_\_\_\_

PROPOSED SUBSTITUTION (Provide product name, Model, manufacturer):  
\_\_\_\_\_

Differences between proposed substitution and specified product:  
\_\_\_\_\_  
\_\_\_\_\_

**POINT-BY-POINT COMPARATIVE DATA SHEET ATTACHED - REQUIRED BY ARCHITECT  
FOR THIS REQUEST:**

- A. Attached Data includes product description, specifications, drawings, photographs, and performance and test data, applicable portions of the data adequate for the evaluation of the request, and with applicable portions of the data clearly identified.
- B. \_\_\_\_yes \_\_\_\_no changes will be required to the Contract Documents for the proper installation of proposed product substitution. If yes, then attach data that includes description of changes.

**THE UNDERSIGNED CERTIFIES THAT THE FOLLOWING PARAGRAPHS, UNLESS MODIFIED  
BY ATTACHMENTS, ARE CORRECT:**

- C. Proposed substitution has been fully investigated and determined to be equal or superior in all respects to the specified products performance.
- D. Proposed substitution does not affect the building design, engineering design, dimensions, detailing, or performance values.
- E. The proposed substitution will have no adverse effect on other trades, the construction schedule, or specified warranty requirements.
- F. No maintenance is required by the proposed substitution other than that required for originally specified product.
- G. Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by substitution.

SIGNATURE \_\_\_\_\_ PRINTED NAME: \_\_\_\_\_

**ARCHITECT'S REVIEW AND ACTION:**

- A. \_\_\_\_ Accepted As Noted \_\_\_\_ Incomplete Information  
\_\_\_\_ Received Too Late \_\_\_\_ No Substitutions accepted for this product
- B. Reviewed By: \_\_\_\_\_ DATE: \_\_\_\_\_
- C. Processed by Addendum No. \_\_\_\_\_

D. Comments:

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**END OF SECTION**

**SECTION 01 30 00  
ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General administrative requirements.
- B. Preconstruction meeting.
- C. Site mobilization meeting.
- D. Progress meetings.
- E. Construction progress schedule.
- F. Progress photographs.
- G. Submittals for review, information, and project closeout.
- H. Number of copies of submittals.
- I. Requests for Interpretation (RFI) procedures.
- J. Submittal procedures.

**1.02 RELATED REQUIREMENTS**

- A. Section 00 72 00 - General Conditions: Dates for applications for payment.
- B. Section 01 60 00 - Product Requirements: General product requirements.
- C. Section 01 70 00 - Execution and Closeout Requirements: Additional coordination requirements.
- D. Section 01 78 00 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

**1.03 REFERENCE STANDARDS**

- A. AIA G716 - Request for Information; 2004.
- B. AIA G810 - Transmittal Letter; 2001.

**1.04 GENERAL ADMINISTRATIVE REQUIREMENTS**

- A. Comply with requirements of Section 01 70 00 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect:
  - 1. Requests for Interpretation (RFI).
  - 2. Requests for substitution.
  - 3. Shop drawings, product data, and samples.
  - 4. Test and inspection reports.
  - 5. Design data.
  - 6. Manufacturer's instructions and field reports.
  - 7. Applications for payment and change order requests.
  - 8. Progress schedules.
  - 9. Coordination drawings.
  - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
  - 11. Closeout submittals.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PRECONSTRUCTION MEETING**

- A. Architect will schedule a meeting after Notice of Award.
- B. Attendance Required:
  - 1. Owner.
  - 2. Architect.
  - 3. Contractor.
- C. Agenda:
  - 1. Execution of Owner-Contractor Agreement.
  - 2. Submission of executed bonds and insurance certificates.
  - 3. Distribution of Contract Documents.
  - 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
  - 5. Submission of initial Submittal schedule.
  - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  - 7. Scheduling.
  - 8. Scheduling activities of a Geotechnical Engineer, if applicable.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

**3.02 SITE MOBILIZATION MEETING**

- A. Architect will schedule meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required:
  - 1. Contractor.
  - 2. Owner.
  - 3. Architect.
  - 4. Contractor's superintendent.
  - 5. Major subcontractors.
- C. Agenda:
  - 1. Use of premises by Owner and Contractor.
  - 2. Owner's requirements.
  - 3. Construction facilities and controls provided by Owner.
  - 4. Temporary utilities provided by Owner.
  - 5. Survey and building layout.
  - 6. Security and housekeeping procedures.
  - 7. Schedules.
  - 8. Application for payment procedures.
  - 9. Procedures for testing.
  - 10. Procedures for maintaining record documents.
  - 11. Requirements for start-up of equipment.
  - 12. Inspection and acceptance of equipment put into service during construction period.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

### **3.03 PROGRESS MEETINGS**

- A. Schedule and administer meetings throughout progress of the work at maximum bi-monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required:
  - 1. Contractor.
  - 2. Owner.
  - 3. Architect.
  - 4. Contractor's superintendent.
  - 5. Major subcontractors.
- D. Agenda:
  - 1. Review minutes of previous meetings.
  - 2. Review of work progress.
  - 3. Field observations, problems, and decisions.
  - 4. Identification of problems that impede, or will impede, planned progress.
  - 5. Review of submittals schedule and status of submittals.
  - 6. Review of RFIs log and status of responses.
  - 7. Maintenance of progress schedule.
  - 8. Corrective measures to regain projected schedules.
  - 9. Planned progress during succeeding work period.
  - 10. Coordination of projected progress.
  - 11. Maintenance of quality and work standards.
  - 12. Effect of proposed changes on progress schedule and coordination.
  - 13. Other business relating to work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

### **3.04 CONSTRUCTION PROGRESS SCHEDULE**

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
  - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.

### **3.05 PROGRESS PHOTOGRAPHS**

- A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment.
- B. Maintain one set of all photographs at project site for reference; same copies as submitted, identified as such.
- C. Photography Type: Digital; electronic files.

- D. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to Architect.
- E. In addition to periodic, recurring views, take photographs of each of the following events:
  - 1. Completion of site clearing.
  - 2. Excavations in progress.
  - 3. Foundations in progress and upon completion.
  - 4. Structural framing in progress and upon completion.
  - 5. Enclosure of building, upon completion.
  - 6. Final completion, minimum of ten (10) photos.
- F. Views:
  - 1. Provide aerial photographs from four cardinal views at each specified time, until structure is enclosed.
  - 2. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
  - 3. Consult with Architect for instructions on views required.
  - 4. Provide factual presentation.
  - 5. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
- G. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
  - 1. Delivery Medium: Via email.
  - 2. File Naming: Include project identification, date and time of view, and view identification.
  - 3. Point of View Sketch: Include digital copy of point of view sketch with each electronic submittal; include point of view identification in each photo file name.
  - 4. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.
  - 5. Photo CD(s): Provide 1 copy including all photos cumulative to date and PDF file(s), with files organized in separate folders by submittal date.
  - 6. Hard Copy: Printed hardcopy (grayscale) of PDF file and point of view sketch.

### **3.06 REQUESTS FOR INFORMATION (RFI)**

- A. Definition: A request seeking one of the following:
  - 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
  - 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
  - 1. Prepare a separate RFI for each specific item.
    - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.

- b. Do not forward requests which solely require internal coordination between subcontractors.
  2. Prepare in a format and with content acceptable to Owner.
    - a. Use AIA G716 - Request for Information .
  3. Prepare using an electronic version of the form appended to this section.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
  1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
  2. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
    - a. Approval of submittals (use procedures specified elsewhere in this section).
    - b. Approval of substitutions (see Section - 01 60 00 - Product Requirements)
    - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
    - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
  3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
  4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
    - a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
  1. Official Project name and number, and any additional required identifiers established in Contract Documents.
  2. Owner's, Architect's, and Contractor's names.
  3. Discrete and consecutive RFI number, and descriptive subject/title.
  4. Issue date, and requested reply date.
  5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
  6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
  7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
  1. Indicate current status of every RFI. Update log promptly and on a regular basis.
  2. Note dates of when each request is made, and when a response is received.

3. Highlight items requiring priority or expedited response.
  4. Highlight items for which a timely response has not been received to date.
- H. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
  2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
  3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
  4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

### **3.07 SUBMITTAL SCHEDULE**

- A. Submit to Architect for review a schedule for submittals in tabular format.
1. Submit at the same time as the preliminary schedule specified in Section - 01 32 16 - Construction Progress Schedule.
  2. Coordinate with Contractor's construction schedule and schedule of values.
  3. Format schedule to allow tracking of status of submittals throughout duration of construction.
  4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
  5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
    - a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

### **3.08 SUBMITTALS FOR REVIEW**

- A. When the following are specified in individual sections, submit them for review:
1. Product data.
  2. Shop drawings.
  3. Samples for selection.
  4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.



- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - Closeout Submittals.

### **3.09 SUBMITTALS FOR INFORMATION**

- A. When the following are specified in individual sections, submit them for information:
1. Design data.
  2. Sustainability design submittals and reports.
  3. Certificates.
  4. Test reports.
  5. Inspection reports.
  6. Manufacturer's instructions.
  7. Manufacturer's field reports.
  8. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

### **3.10 SUBMITTALS FOR PROJECT CLOSEOUT**

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 78 00 - Closeout Submittals:
1. Project record documents.
  2. Operation and maintenance data.
  3. Warranties.
  4. Bonds.
  5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

### **3.11 NUMBER OF COPIES OF SUBMITTALS**

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Extra Copies at Project Closeout: See Section 01 78 00.
- C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
1. After review, produce duplicates.
  2. Retained samples will not be returned to Contractor unless specifically so stated.

### **3.12 SUBMITTAL PROCEDURES**

- A. General Requirements:
1. Use a separate transmittal for each item.
  2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
  3. Transmit using approved form options.
    - a. Use Form AIA G810.
    - b. Use form generated by Electronic Document Submittal Service software.
  4. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
-

5. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
  6. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
    - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
  7. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
    - a. Send submittals in electronic format via email to Architect.
  8. Schedule submittals to expedite the Project, and coordinate submission of related items.
    - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
    - b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
    - c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 days.
  9. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
  10. When revised for resubmission, identify all changes made since previous submission.
  11. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
  12. Submittals not requested will be recognized, and will be returned "Not Reviewed",
- B. Product Data Procedures:
1. Submit only information required by individual specification sections.
  2. Collect required information into a single submittal.
  3. Submit concurrently with related shop drawing submittal.
  4. Do not submit (Material) Safety Data Sheets for materials or products.
  5. Submit sustainable design reporting submittals under separate cover.
- C. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
  2. Do not reproduce Contract Documents to create shop drawings.
  3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Samples Procedures:
1. Transmit related items together as single package.
  2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
  3. Include with transmittal high-resolution image files of samples to facilitate electronic review and approval. Provide separate submittal page for each item image.

### 3.13 SUBMITTAL REVIEW

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.

- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
  - 1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- D. Architect's and consultants' actions on items submitted for review:
  - 1. Authorizing purchasing, fabrication, delivery, and installation:
    - a. "Approved", or language with same legal meaning.
    - b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
      - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
    - c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
      - 1) Resubmit corrected item, with review notations acknowledged and incorporated. Resubmit separately, or as part of project record documents.
      - 2) Non-responsive resubmittals may be rejected.
  - 2. Not Authorizing fabrication, delivery, and installation:
    - a. "Revise and Resubmit".
      - 1) Resubmit revised item, with review notations acknowledged and incorporated.
      - 2) Non-responsive resubmittals may be rejected.
    - b. "Rejected".
      - 1) Submit item complying with requirements of Contract Documents.
- E. Architect's and consultants' actions on items submitted for information:
  - 1. Items for which no action was taken:
    - a. "Received" - to notify the Contractor that the submittal has been received for record only.
  - 2. Items for which action was taken:
    - a. "Reviewed" - no further action is required from Contractor.

**END OF SECTION**

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**SECTION 01 32 16  
CONSTRUCTION PROGRESS SCHEDULE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Preliminary schedule.
- B. Construction progress schedule, with network analysis diagrams and reports.

**1.02 RELATED SECTIONS**

- A. Section 01 10 00 - Summary: Work sequence.

**1.03 REFERENCE STANDARDS**

- A. AGC (CPSM) - Construction Planning and Scheduling Manual; 2004.

**1.04 SUBMITTALS**

- A. Within 10 days after date of Agreement, submit preliminary schedule.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
  - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.
- F. Submit in PDF format.
- G. Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.
- H. Submit one reproducible transparency and one opaque reproduction.
- I. Submit under transmittal letter form specified in Section 01 30 00 - Administrative Requirements.

**1.05 QUALITY ASSURANCE**

- A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

**1.06 SCHEDULE FORMAT**

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
- B. Diagram Sheet Size: Maximum 22 x 17 inches.
- C. Sheet Size: Multiples of 8-1/2 x 11 inches.
- D. Scale and Spacing: To allow for notations and revisions.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PRELIMINARY SCHEDULE**

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

**3.02 CONTENT**

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Identify work of separate stages and other logically grouped activities.
- D. Provide sub-schedules for each stage of Work identified in Section 01 10 00 - Summary.
- E. Provide sub-schedules to define critical portions of the entire schedule.
- F. Include conferences and meetings in schedule.
- G. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- H. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
- I. Indicate delivery dates for owner-furnished products.
- J. Coordinate content with schedule of values specified in Section 01 20 00 - Price and Payment Procedures.
- K. Provide legend for symbols and abbreviations used.

**3.03 BAR CHARTS**

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

**3.04 NETWORK ANALYSIS**

- A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.
- B. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.
- C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
  - 1. Preceding and following event numbers.
  - 2. Activity description.
  - 3. Estimated duration of activity, in maximum 15 day intervals.
  - 4. Earliest start date.
  - 5. Earliest finish date.
  - 6. Actual start date.
  - 7. Actual finish date.
  - 8. Latest start date.
  - 9. Latest finish date.

10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
  11. Monetary value of activity, keyed to Schedule of Values.
  12. Percentage of activity completed.
  13. Responsibility.
- D. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, accepting revised completion dates, and recomputation of all dates and float.
- E. Required Reports: List activities in sorts or groups:
1. By preceding work item or event number from lowest to highest.
  2. By amount of float, then in order of early start.
  3. By responsibility in order of earliest possible start date.
  4. In order of latest allowable start dates.
  5. Contractor's periodic payment request sorted by Schedule of Values listings.
  6. Listing of basic input data that generates the report.
  7. Listing of activities on the critical path.

### **3.05 REVIEW AND EVALUATION OF SCHEDULE**

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 10 days.

### **3.06 UPDATING SCHEDULE**

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.
- G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect.

### **3.07 DISTRIBUTION OF SCHEDULE**

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

**END OF SECTION**

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**SECTION 01 40 00  
QUALITY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Submittals.
- B. Quality assurance.
- C. References and standards.
- D. Testing and inspection agencies and services.
- E. Contractor's construction-related professional design services.
- F. Contractor's design-related professional design services.
- G. Control of installation.
- H. Mock-ups.
- I. Tolerances.
- J. Manufacturers' field services.
- K. Defect Assessment.

**1.02 RELATED REQUIREMENTS**

- A. Document 00 72 00 - General Conditions: Inspections and approvals required by public authorities.
- B. Section 01 30 00 - Administrative Requirements: Submittal procedures.
- C. Section 01 42 16 - Definitions.
- D. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

**1.03 REFERENCE STANDARDS**

- A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2023).
- B. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation; 2024.
- C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2023.
- D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2023.
- E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2020.
- F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2021.
- G. ASTM E699 - Standard Specification for Agencies Involved in Testing, Quality Assurance, and Evaluating of Manufactured Building Components; 2016.
- H. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2018.

**1.04 DEFINITIONS**

- A. Contractor's Quality Control Plan: Contractor's management plan for executing the Contract for Construction.

- B. Contractor's Professional Design Services: Design of some aspect or portion of the project by party other than the design professional of record. Provide these services as part of the Contract for Construction.
  - 1. Design Services Types Required:
    - a. Construction-Related: Services Contractor needs to provide in order to carry out the Contractor's sole responsibilities for construction means, methods, techniques, sequences, and procedures.
    - b. Design-Related: Design services explicitly required to be performed by another design professional due to highly-technical and/or specialized nature of a portion of the project. Services primarily involve engineering analysis, calculations, and design, and are not intended to alter the aesthetic aspects of the design.
- C. Design Data: Design-related, signed and sealed drawings, calculations, specifications, certifications, shop drawings and other submittals provided by Contractor, and prepared directly by, or under direct supervision of, appropriately licensed design professional.

#### **1.05 CONTRACTOR'S CONSTRUCTION-RELATED PROFESSIONAL DESIGN SERVICES**

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Provide such engineering design services as may be necessary to plan and safely conduct certain construction operations, pertaining to, but not limited to the following:
  - 1. Temporary sheeting, shoring, or supports.
  - 2. Temporary scaffolding.
  - 3. Temporary bracing.
  - 4. Temporary falsework for support of spanning or arched structures.
  - 5. Temporary foundation underpinning.
  - 6. Temporary stairs or steps required for construction access only.
  - 7. Temporary hoist(s) and rigging.
  - 8. Investigation of soil conditions to support construction equipment.

#### **1.06 CONTRACTOR'S DESIGN-RELATED PROFESSIONAL DESIGN SERVICES**

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Base design on performance and/or design criteria indicated in individual specification sections.
  - 1. Submit a Request for Interpretation to Architect if the criteria indicated are not sufficient to perform required design services.

#### **1.07 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Designer's Qualification Statement: Submit for Architect's knowledge as contract administrator, or for Owner's information.
  - 1. Include information for each individual professional responsible for producing, or supervising production of, design-related professional services provided by Contractor.
    - a. Full name.
    - b. Professional licensure information.
    - c. Statement addressing extent and depth of experience specifically relevant to design of items assigned to Contractor.
- C. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.

1. Include calculations that have been used to demonstrate compliance to performance and regulatory criteria provided, and to determine design solutions.
  2. Include required product data and shop drawings.
  3. Include a statement or certification attesting that design data complies with criteria indicated, such as building codes, loads, functional, and similar engineering requirements.
  4. Include signature and seal of design professional responsible for allocated design services on calculations and drawings.
- D. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
1. Include:
    - a. Date issued.
    - b. Project title and number.
    - c. Name of inspector.
    - d. Date and time of sampling or inspection.
    - e. Identification of product and specifications section.
    - f. Location in the Project.
    - g. Type of test/inspection.
    - h. Date of test/inspection.
    - i. Results of test/inspection.
    - j. Compliance with Contract Documents.
    - k. When requested by Architect, provide interpretation of results.
  2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
- E. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
  2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- F. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- G. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
1. Submit report in duplicate within 30 days of observation to Architect for information.
  2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
- H. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
  2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

### 1.08 QUALITY ASSURANCE

- A. Testing Agency Qualifications:
  - 1. Prior to start of work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
  - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
- B. Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

### 1.09 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

### 1.10 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Contractor shall employ and pay for services of an independent testing agency to perform specified testing.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- C. Contractor Employed Agency:
  - 1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM E699, ASTM C1021, ASTM C1077, ASTM C1093, and ASTM D3740.
  - 2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
  - 3. Laboratory Qualifications: Accredited by IAS according to IAS AC89.
  - 4. Laboratory: Authorized to operate in the State in which the Project is located.
  - 5. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
  - 6. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 CONTROL OF INSTALLATION**

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

**3.02 MOCK-UPS**

- A. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.
- B. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.
- C. Notify Architect fifteen (15) working days in advance of dates and times when mock-ups will be constructed.
- D. Provide supervisory personnel who will oversee mock-up construction. Provide workers that will be employed during the construction at Project.
- E. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- F. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- G. Obtain Architect's approval of mock-ups before starting work, fabrication, or construction.
  - 1. Architect will issue written comments within seven (7) working days of initial review and each subsequent follow up review of each mock-up.
  - 2. Make corrections as necessary until Architect's approval is issued.
- H. Architect will use accepted mock-ups as a comparison standard for the remaining Work.
- I. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

**3.03 TOLERANCES**

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

### **3.04 TESTING AND INSPECTION**

- A. See individual specification sections for testing and inspection required.
- B. Testing Agency Duties:
  - 1. Test samples of mixes submitted by Contractor.
  - 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
  - 3. Perform specified sampling and testing of products in accordance with specified standards.
  - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
  - 5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
  - 6. Perform additional tests and inspections required by Architect.
  - 7. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
  - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
  - 2. Agency may not approve or accept any portion of the Work.
  - 3. Agency may not assume any duties of Contractor.
  - 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
  - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
  - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
  - 3. Provide incidental labor and facilities:
    - a. To provide access to Work to be tested/inspected.
    - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
    - c. To facilitate tests/inspections.
    - d. To provide storage and curing of test samples.
  - 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
  - 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
  - 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

### **3.05 MANUFACTURERS' FIELD SERVICES**

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of

surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.

- B. Submit qualifications of observer to Architect 30 days in advance of required observations.
  - 1. Observer subject to approval of Architect.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

**3.06 DEFECT ASSESSMENT**

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

**END OF SECTION**

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**SECTION 01 42 16  
DEFINITIONS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This section supplements the definitions contained in the General Conditions.
- B. Other definitions are included in individual specification sections.

**1.02 DEFINITIONS**

- A. Furnish: To supply, deliver, unload, and inspect for damage.
- B. Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.
- C. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.
- D. Project Manual: The book-sized volume that includes the procurement requirements (if any), the contracting requirements, and the specifications.
- E. Provide: To furnish and install.
- F. Supply: Same as Furnish.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

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**SECTION 01 45 33**  
**CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Code-required special inspections.
- B. Testing services incidental to special inspections.
- C. Submittals.
- D. Fabricators' field services.

**1.02 REFERENCE STANDARDS**

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
- B. AISC 341 - Seismic Provisions for Structural Steel Buildings; 2016 (Revised 2018).
- C. AISC 360 - Specification for Structural Steel Buildings; 2016.
- D. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- E. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field; 2019a.
- F. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete; 2017.
- G. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2023.
- H. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2020.
- I. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2021.
- J. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- K. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.
- L. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel; 2018.
- M. ICC (IBC)-2009 - International Building Code; 2009.

**1.03 SUBMITTALS**

- A. Special Inspection Agency Qualifications: Prior to the start of work, the Special Inspection Agency is required to:
  - 1. Submit agency name, address, and telephone number, names of full time registered Engineer and responsible officer.
  - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
  - 3. Submit certification that Special Inspection Agency is acceptable to AHJ.
- B. Test Reports: After each test or inspection, promptly submit at least two copies of report; one to Architect and one to AHJ.
  - 1. Include:

- a. Date issued.
  - b. Project title and number.
  - c. Name of inspector.
  - d. Date and time of sampling or inspection.
  - e. Identification of product and specifications section.
  - f. Location in the Project.
  - g. Type of test or inspection.
  - h. Date of test or inspection.
  - i. Results of test or inspection.
  - j. Compliance with Contract Documents.
- C. Fabricator's Field Reports: Submit reports to Architect and AHJ.
1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in Contract Documents.

#### **1.04 SPECIAL INSPECTION AGENCY**

- A. Owner or Architect will employ services of a Special Inspection Agency to perform inspections and associated testing and sampling in accordance with ASTM E329 and required by the building code.
- B. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of Contract Documents.

#### **1.05 TESTING AND INSPECTION AGENCIES**

#### **1.06 QUALITY ASSURANCE**

- A. Testing Agency Qualifications:
  1. Independent firm specializing in performing testing and inspections of the type specified in this section.
- B. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document.

### **PART 2 PRODUCTS - NOT USED**

### **PART 3 EXECUTION**

#### **3.01 SCHEDULE OF SPECIAL INSPECTIONS, GENERAL**

- A. Frequency of Special Inspections: Special Inspections are indicated as continuous or periodic.
  1. Continuous Special Inspection: Special Inspection Agency is required to be present in the area where the work is being performed and observe the work at all times the work is in progress.
  2. Periodic Special Inspection: Special Inspection Agency is required to be present in the area where work is being performed and observe the work part-time or intermittently and at the completion of the work.

#### **3.02 SPECIAL INSPECTIONS FOR STEEL CONSTRUCTION**

- A. High-Strength Bolt, Nut and Washer Material:
  1. Verify identification markings comply with ASTM standards specified in the approved contract and to AISC 360, Section A3.3; periodic.
  2. Submit manufacturer's certificates of compliance; periodic.

- B. High-Strength Bolting Installation: Verify items listed below comply with AISC 360, Section M2.5.
  - 1. Snug tight joints; periodic.
- C. Structural Steel and Cold Formed Steel Deck Material:
  - 1. Structural Steel: Verify identification markings comply with AISC 360, Section M3.5; periodic.
  - 2. Other Steel: Verify identification markings comply with ASTM standards specified in the approved Contract Documents; periodic.
  - 3. Submit manufacturer's certificates of compliance and test reports; periodic.
- D. Weld Filler Material:
  - 1. Verify identification markings comply with AWS standards specified in the approved Contract Documents and to AISC 360, Section A3.5; periodic.
  - 2. Submit manufacturer's certificates of compliance; periodic.
- E. Welding:
  - 1. Structural Steel and Cold Formed Steel Deck:
    - a. Complete and Partial Joint Penetration Groove Welds: Verify compliance with AWS D1.1/D1.1M; continuous.
    - b. Multipass Fillet Welds: Verify compliance with AWS D1.1/D1.1M; continuous.
    - c. Single Pass Fillet Welds Less than 5/16 inch Wide: Verify compliance with AWS D1.1/D1.1M; periodic.
    - d. Plug and Slot Welds: Verify compliance with AWS D1.1/D1.1M; continuous.
    - e. Single Pass Fillet Welds 5/16 inch or Greater: Verify compliance with AWS D1.1/D1.1M; continuous.
    - f. Floor and Roof Deck Welds: Verify compliance with AWS D1.3/D1.3M; continuous.
  - 2. Reinforcing Steel: Verify items listed below comply with AWS D1.4/D1.4M and ACI 318, Section 3.5.2.
    - a. Verification of weldability; periodic.
    - b. Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames as well as boundary elements of special structural walls of concrete and shear reinforcement; continuous.
    - c. Shear reinforcement; continuous.
    - d. Other reinforcing steel; periodic.
- F. Steel Frame Joint Details: Verify compliance with approved Contract Documents.
  - 1. Details, bracing and stiffening; periodic.
  - 2. Member locations; periodic.
  - 3. Application of joint details at each connection; periodic.
- G. Cold-formed steel trusses spanning 60 feet or more; periodic.

### **3.03 SPECIAL INSPECTIONS FOR CONCRETE CONSTRUCTION**

- A. Reinforcing Steel, Including Prestressing of Tendons and Placement: Verify compliance with approved Contract Documents and ACI 318, Sections 3.5 and 7.1 through 7.7; periodic.
- B. Reinforcing Steel Welding: Verify compliance with AWS D1.4/D1.4M and ACI 318, Section 3.5.2; periodic.
- C. Design Mix: Verify plastic concrete complies with the design mix in approved Contract Documents and with ACI 318, Chapter 4 and 5.2; periodic.

- D. Concrete Sampling Concurrent with Strength Test Sampling: Each time fresh concrete is sampled for strength tests, verify compliance with ASTM C172/C172M, ASTM C31/C31M and ACI 318, Chapter 26.5, 26.12, and record the following, continuous:
  - 1. Slump.
  - 2. Air content.
  - 3. Temperature of concrete.
- E. Specified Curing Temperature and Techniques: Verify compliance with approved Contract Documents and ACI 318, Sections 5.11 through 5.13; periodic.
- F. Concrete Strength in Situ: Verify concrete strength complies with approved Contract Documents and ACI 318, Section 6.2, for the following.
- G. Formwork Shape, Location and Dimensions: Verify compliance with approved Contract Documents and ACI 318, Section 6.1.1; periodic.

#### **3.04 SPECIAL INSPECTIONS FOR SOILS**

- A. Materials and Placement: Verify each item below complies with approved construction documents and approved geotechnical report.
  - 1. Design bearing capacity of material below shallow foundations; periodic.
  - 2. Design depth of excavations and suitability of material at bottom of excavations; periodic.
  - 3. Materials, densities, lift thicknesses; placement and compaction of backfill: continuous.
  - 4. Subgrade, prior to placement of compacted fill verify proper preparation; periodic.
- B. Testing: Classify and test excavated material; periodic.

#### **3.05 SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE**

- A. Seismic Force-Resisting Systems: Comply with the quality assurance plan requirements of AISC 341.
- B. Structural Steel: Comply with the quality assurance plan requirements of AISC 341.
- C. Designated Seismic System Verification: Verify label, anchorage or mounting complies with certificate of compliance provided by manufacturer or fabricator.
- D. Structural Observations for Seismic Resistance: Visually observe structural system for general compliance with the approved Contract Documents; periodic.

#### **3.06 TESTING AGENCY DUTIES AND RESPONSIBILITIES**

- A. Testing Agency Duties:
  - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
  - 2. Perform specified sampling and testing of products in accordance with specified standards.
  - 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
  - 4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of work or products.
  - 5. Perform additional tests and inspections required by Architect.
  - 6. Submit reports of all tests or inspections specified.
- B. Limits on Testing or Inspection Agency Authority:
  - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.

2. Agency may not approve or accept any portion of the work.
  3. Agency may not assume any duties of Contractor.
  4. Agency has no authority to stop the work.
- C. On instructions by Architect, perform re-testing required because of non-compliance with specified requirements, using the same agency.
- D. Contractor will pay for re-testing required because of non-compliance with specified requirements.

### **3.07 CONTRACTOR DUTIES AND RESPONSIBILITIES**

- A. Contractor Responsibilities, General:
1. Deliver to agency at designated location, adequate samples of materials for special inspections that require material verification.
  2. Cooperate with agency and laboratory personnel; provide access to approved documents at project site, to the work, to manufacturers' facilities, and to fabricators' facilities.
  3. Provide incidental labor and facilities:
    - a. To provide access to work to be tested or inspected.
    - b. To obtain and handle samples at the site or at source of Products to be tested or inspected.
    - c. To facilitate tests or inspections.
    - d. To provide storage and curing of test samples.
  4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing or inspection services.
  5. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- B. Contractor Responsibilities, Seismic Force-Resisting System, Designated Seismic System, and Seismic Force-Resisting Component: Submit written statement of responsibility for each item listed in the Statement of Special Inspections to AHJ and Owner prior to starting work. Statement of responsibility shall acknowledge awareness of special construction requirements and other requirements listed.

**END OF SECTION**

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**SECTION 01 50 00  
TEMPORARY FACILITIES AND CONTROLS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary telecommunications services.
- B. Temporary sanitary facilities.
- C. Vehicular access and parking.
- D. Waste removal facilities and services.
- E. Project identification sign.
- F. Field offices.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 51 00 - Temporary Utilities.

**1.03 TEMPORARY UTILITIES - SEE SECTION 01 51 00**

**1.04 TELECOMMUNICATIONS SERVICES**

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
  - 1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.
  - 2. Telephone Land Lines: One line, minimum; one handset per line.
  - 3. Internet Connections: Minimum of one; DSL modem or faster.

**1.05 TEMPORARY SANITARY FACILITIES**

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Use of existing facilities is not permitted.
- C. Maintain daily in clean and sanitary condition.
- D. At end of construction, return facilities to same or better condition as originally found.

**1.06 EXTERIOR ENCLOSURES**

- A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

**1.07 VEHICULAR ACCESS AND PARKING**

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Existing on-site roads may be used for construction traffic.

- F. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

**1.08 WASTE REMOVAL**

- A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.
- B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- C. Provide containers with lids. Remove trash from site periodically.
- D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

**1.09 PROJECT IDENTIFICATION**

- A. Provide project identification sign of design and construction indicated on drawings.
- B. Erect on site at location established by Architect.
- C. No other signs are allowed without Owner permission except those required by law.

**1.10 FIELD OFFICES**

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.
- C. Locate offices a minimum distance of 30 feet from existing and new structures.

**1.11 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS**

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.
- E. Restore new permanent facilities used during construction to specified condition.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01 51 00  
TEMPORARY UTILITIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary Utilities: Provision of electricity, lighting, heat, ventilation, and water.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 50 00 - Temporary Facilities and Controls:
  - 1. Temporary telecommunications services for administrative purposes.
  - 2. Temporary sanitary facilities required by law.

**1.03 REFERENCE STANDARDS**

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

**1.04 TEMPORARY ELECTRICITY**

- A. Cost: By Contractor.
- B. Provide power service required from utility source.
- C. Complement existing power service capacity and characteristics as required.
- D. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each floor. Provide flexible power cords as required.
- E. Provide main service disconnect and over-current protection at convenient location and meter.
- F. Permanent convenience receptacles may be utilized during construction.
- G. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

**1.05 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES**

- A. Provide and maintain LED lighting as suitable for the application for construction operations in accordance with requirements of 29 CFR 1926 and authorities having jurisdiction.
- B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- C. Maintain lighting and provide routine repairs.
- D. Permanent building lighting may be utilized during construction.

**1.06 TEMPORARY HEATING**

- A. Cost of Energy: By Contractor.
- B. Provide heating devices and heat as needed to maintain specified conditions for construction operations.
- C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

**1.07 TEMPORARY COOLING**

- A. Cost of Energy: By Contractor.
- B. Provide cooling devices and cooling as needed to maintain specified conditions for construction operations.
- C. Maintain maximum ambient temperature of 80 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

**1.08 TEMPORARY VENTILATION**

**1.09 TEMPORARY WATER SERVICE**

- A. Cost of Water Used: By Contractor.
- B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
- C. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01 60 00  
PRODUCT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General product requirements.
- B. Re-use of existing products.
- C. Transportation, handling, storage and protection.
- D. Product option requirements.
- E. Substitution limitations.
- F. Procedures for Owner-supplied products.
- G. Maintenance materials, including extra materials, spare parts, tools, and software.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 10 00 - Summary: Identification of Owner-supplied products.
- B. Section 01 25 00 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- C. Section 01 40 00 - Quality Requirements: Product quality monitoring.
- D. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.
- E. Section 01 74 19 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.
- F. Section 22 05 13 - Common Motor Requirements for Plumbing Equipment: Motors for plumbing equipment.
- G. Section 23 05 13 - Common Motor Requirements for HVAC Equipment: Motors for HVAC equipment.

**1.03 REFERENCE STANDARDS**

- A. NEMA MG 1 - Motors and Generators; 2018.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

**1.04 SUBMITTALS**

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
  - 1. Submit within 15 days after date of Agreement.
  - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

## **PART 2 PRODUCTS**

### **2.01 EXISTING PRODUCTS**

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.
- B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.
- C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

### **2.02 NEW PRODUCTS**

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. See Section 01 40 00 - Quality Requirements, for additional source quality control requirements.
- C. Use of products having any of the following characteristics is not permitted:
  1. Made outside the United States, its territories, Canada, or Mexico.
  2. Made using or containing CFC's or HCFC's.
  3. Made of wood from newly cut old growth timber.
  4. Containing lead, cadmium, or asbestos.
- D. Where other criteria are met, Contractor shall give preference to products that:
  1. If used on interior, have lower emissions, as defined in Section 01 61 16.
  2. If wet-applied, have lower VOC content, as defined in Section 01 61 16.
  3. Are extracted, harvested, and/or manufactured closer to the location of the project.
  4. Have longer documented life span under normal use.
- E. Provide interchangeable components of the same manufacture for components being replaced.
- F. Motors: Refer to Section 21 05 13 - Common Motor Requirements for Fire Suppression Equipment, NEMA MG 1 Type. Specific motor type is specified in individual specification sections.
- G. Motors: Refer to Section 22 05 13 - Common Motor Requirements for Plumbing Equipment, NEMA MG 1 Type. Specific motor type is specified in individual specification sections.
- H. Motors: Refer to Section 23 05 13 - Common Motor Requirements for HVAC Equipment, NEMA MG 1 Type. Specific motor type is specified in individual specification sections.
- I. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.
- J. Cord and Plug: Provide minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

### **2.03 PRODUCT OPTIONS**

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.
- D. Products indicated in the color and finish schedules or drawing notes, including aesthetics, such as color, shade, hue, translucence, opacity, pattern or texture, establish the Basis of Design. Use the Basis of Design or submit a request for substitution for any product not indicated.
- E. Where a definite material is indicated as "Basis of Design," it is the intent to set a definite standard and shall be included in the contract amount.

#### **2.04 MAINTENANCE MATERIALS**

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

### **PART 3 EXECUTION**

#### **3.01 SUBSTITUTION LIMITATIONS**

- A. See Section 01 25 00 - Substitution Procedures.

#### **3.02 OWNER-SUPPLIED PRODUCTS**

- A. See Section 01 10 00 - Summary for identification of Owner-supplied products.
- B. Owner's Responsibilities:
  - 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
  - 2. Arrange and pay for product delivery to site.
  - 3. On delivery, inspect products jointly with Contractor.
  - 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
  - 5. Arrange for manufacturers' warranties, inspections, and service.
- C. Contractor's Responsibilities:
  - 1. Review Owner reviewed shop drawings, product data, and samples.
  - 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
  - 3. Handle, store, install and finish products.
  - 4. Repair or replace items damaged after receipt.

#### **3.03 TRANSPORTATION AND HANDLING**

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

### **3.04 STORAGE AND PROTECTION**

- A. Provide protection of stored materials and products against theft, casualty, or deterioration.
- B. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 74 19.
  - 1. Structural Loading Limitations: Handle and store products and materials so as not to exceed static and dynamic load-bearing capacities of project floor and roof areas.
- C. Store and protect products in accordance with manufacturers' instructions.
- D. Store with seals and labels intact and legible.
- E. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- F. For exterior storage of fabricated products, place on sloped supports above ground.
- G. Provide off-site storage and protection when site does not permit on-site storage or protection.
  - 1. Execute a formal supplemental agreement between Owner and Contractor allowing off-site storage, for each occurrence.
- H. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- I. Comply with manufacturer's warranty conditions, if any.
- J. Do not store products directly on the ground.
- K. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- L. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- M. Prevent contact with material that may cause corrosion, discoloration, or staining.
- N. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- O. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

**END OF SECTION**



**SECTION 01 61 16**  
**VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Requirements for Indoor-Emissions-Restricted products.
- B. Requirements for VOC-Content-Restricted products.
- C. Requirement for installer certification that they did not use any non-compliant products.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 30 00 - Administrative Requirements: Submittal procedures.
- B. Section 01 33 29.07 - Prohibited Content Installer Certification: Form for certifying that no non-compliant products were used.

**1.03 DEFINITIONS**

- A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
  - 1. Interior paints and coatings applied on site.
  - 2. Interior adhesives and sealants applied on site, including flooring adhesives.
  - 3. Flooring.
  - 4. Composite wood.
  - 5. Products making up wall and ceiling assemblies.
  - 6. Thermal and acoustical insulation.
  - 7. Free-standing furniture.
  - 8. Exterior applied products (for Healthcare and Schools projects only).
- B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
  - 1. Interior paints and coatings applied on site.
  - 2. Interior adhesives and sealants applied on site, including flooring adhesives.
  - 3. Other products when specifically stated in the specifications.
- C. Interior of Building: Anywhere inside the exterior weather barrier.
- D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.
- F. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
  - 1. Concrete.
  - 2. Clay brick.
  - 3. Metals that are plated, anodized, or powder-coated.
  - 4. Glass.
  - 5. Ceramics.
  - 6. Solid wood flooring that is unfinished and untreated.

#### 1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2018).
- C. BIFMA e3 - Furniture Sustainability Standard; Business and Institutional Furniture Manufacturers Association; 2019.
- D. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers; 2017, v1.2.
- E. CARB (ATCM) - Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products; California Air Resources Board; current edition.
- F. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.
- G. CHPS (HPPD) - High Performance Products Database; Current Edition at [www.chps.net/](http://www.chps.net/).
- H. CRI (GLP) - Green Label Plus Testing Program - Certified Products; Current Edition.
- I. SCAQMD 1113 - Architectural Coatings; 1977 (Amended 2016).
- J. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).
- K. SCS (CPD) - SCS Certified Products; Current Edition.
- L. UL (GGG) - GREENGUARD Gold Certified Products; Current Edition.

#### 1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.
- C. Installer Certifications Regarding Prohibited Content: Require each installer of any type of product (not just the products for which VOC restrictions are specified) to certify that either 1) no adhesives, joint sealants, paints, coatings, or composite wood or agrifiber products have been used in the installation of installer's products, or 2) that such products used comply with these requirements.

#### 1.06 QUALITY ASSURANCE

- A. Indoor Emissions Standard and Test Method: CAL (CDPH SM), using Standard Private Office exposure scenario and the allowable concentrations specified in the method, and range of total VOC's after 14 days.
  - 1. Wet-Applied Products: State amount applied in mass per surface area.
  - 2. Paints and Coatings: Test tinted products, not just tinting bases.
  - 3. Evidence of Compliance: Acceptable types of evidence are the following;
    - a. Current UL (GGG) certification.
    - b. Current SCS (CPD) Floorscore certification.
    - c. Current SCS (CPD) Indoor Advantage Gold certification.
    - d. Current listing in CHPS (HPPD) as a low-emitting product.
    - e. Current CRI (GLP) certification.
    - f. Test report showing compliance and stating exposure scenario used.

4. Product data submittal showing VOC content is NOT acceptable evidence.
5. Manufacturer's certification without test report by independent agency is NOT acceptable evidence.
- B. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
  1. Evidence of Compliance: Acceptable types of evidence are:
    - a. Report of laboratory testing performed in accordance with requirements.
    - b. Published product data showing compliance with requirements.
    - c. Certification by manufacturer that product complies with requirements.
- C. Composite Wood Emissions Standard: CARB (ATCM) for ultra-low emitting formaldehyde (ULEF) resins.
  1. Evidence of Compliance: Acceptable types of evidence are:
    - a. Current SCS "No Added Formaldehyde (NAF)" certification; [www.scs-certified.com](http://www.scs-certified.com).
    - b. Report of laboratory testing performed in accordance with requirements.
    - c. Published product data showing compliance with requirements.
    - d. Certification by manufacturer that product complies with requirements.
- D. Furnishings Emissions Standard and Test Method: BIFMA e3 Sections 7.6.1 and 7.6.2, tested in accordance with BIFMA M7.1.
  1. Evidence of Compliance:
    - a. Test report showing compliance and stating exposure scenario used.
- E. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.
- B. Indoor-Emissions-Restricted Products: Comply with Indoor Emissions Standard and Test Method, except for:
  1. Composite Wood, Wood Fiber, and Wood Chip Products: Comply with Composite Wood Emissions Standard or contain no added formaldehyde resins.
  2. Furnishings: Comply with Furnishings Emissions Standard and Test Method.
  3. Inherently Non-Emitting Materials.
- C. VOC-Content-Restricted Products: VOC content not greater than required by the following:
  1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
  2. Joint Sealants: SCAQMD 1168 Rule.
  3. Paints and Coatings: Each color; most stringent of the following:
    - a. 40 CFR 59, Subpart D.
    - b. SCAQMD 1113 Rule.
    - c. CARB (SCM).

## **PART 3 EXECUTION**

### **3.01 FIELD QUALITY CONTROL**

- A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.

- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

**END OF SECTION**

**SECTION 01 70 00  
EXECUTION AND CLOSEOUT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Examination, preparation, and general installation procedures.
- B. Pre-installation meetings.
- C. Cutting and patching.
- D. Surveying for laying out the work.
- E. Cleaning and protection.
- F. Starting of systems and equipment.
- G. Demonstration and instruction of Owner personnel.
- H. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- I. General requirements for maintenance service.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 79 00 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections
- B. Section 07 84 00 - Firestopping.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
  - 1. On request, submit documentation verifying accuracy of survey work.
  - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
  - 3. Submit surveys and survey logs for the project record.
- C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
  - 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
  - 2. Identify demolition firm and submit qualifications.
  - 3. Include a summary of safety procedures.
- D. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
  - 1. Structural integrity of any element of Project.
  - 2. Integrity of weather exposed or moisture resistant element.
  - 3. Efficiency, maintenance, or safety of any operational element.
  - 4. Visual qualities of sight exposed elements.
  - 5. Work of Owner or separate Contractor.
  - 6. Include in request:
    - a. Identification of Project.
    - b. Location and description of affected work.
    - c. Necessity for cutting or alteration.

- d. Description of proposed work and products to be used.
- e. Alternatives to cutting and patching.
- f. Effect on work of Owner or separate Contractor.
- g. Written permission of affected separate Contractor.
- h. Date and time work will be executed.

E. Project Record Documents: Accurately record actual locations of capped and active utilities.

#### **1.04 QUALIFICATIONS**

- A. For demolition work, employ a firm specializing in the type of work required.
  - 1. Minimum of 5 years of documented experience.
- B. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,
- C. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State in which the Project is located. Employ only individual(s) trained and experienced in establishing and maintaining horizontal and vertical control points necessary for laying out construction work on project of similar size, scope and/or complexity.
- D. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

#### **1.05 COORDINATION**

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

### **PART 2 PRODUCTS**

#### **2.01 PATCHING MATERIALS**

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00 - Product Requirements.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

#### **3.02 PREPARATION**

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

#### **3.03 PREINSTALLATION MEETINGS**

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
  - 1. Review conditions of examination, preparation and installation procedures.
  - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

#### **3.04 LAYING OUT THE WORK**

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Contractor shall locate and protect survey control and reference points.
- D. Control datum for survey is that indicated on drawings.

- E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- F. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- H. Utilize recognized engineering survey practices.
- I. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.
- J. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
  - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
  - 2. Grid or axis for structures.
  - 3. Building foundation, column locations, ground floor elevations.
  - 4. Controlling lines and levels required for mechanical and electrical trades.
- K. Periodically verify layouts by same means.
- L. Maintain a complete and accurate log of control and survey work as it progresses.
- M. On completion of foundation walls and major site improvements, prepare a certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.

### **3.05 GENERAL INSTALLATION REQUIREMENTS**

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

### **3.06 CUTTING AND PATCHING**

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
  - 1. Complete the work.
  - 2. Fit products together to integrate with other work.
  - 3. Provide openings for penetration of mechanical, electrical, and other services.
  - 4. Match work that has been cut to adjacent work.
  - 5. Repair areas adjacent to cuts to required condition.
  - 6. Repair new work damaged by subsequent work.
  - 7. Remove samples of installed work for testing when requested.
  - 8. Remove and replace defective and non-complying work.
- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.



- D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- F. Restore work with new products in accordance with requirements of Contract Documents.
- G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00, to full thickness of the penetrated element.
- I. Patching:
  - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
  - 2. Match color, texture, and appearance.
  - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

### **3.07 PROGRESS CLEANING**

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

### **3.08 PROTECTION OF INSTALLED WORK**

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.
- G. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- H. Prohibit traffic from landscaped areas.
- I. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

### **3.09 SYSTEM STARTUP**

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

### **3.10 DEMONSTRATION AND INSTRUCTION**

- A. See Section 01 79 00 - Demonstration and Training.

### **3.11 ADJUSTING**

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.
- B. Testing, adjusting, and balancing HVAC systems: See Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.

### **3.12 FINAL CLEANING**

- A. Execute final cleaning prior to final project assessment.
  - 1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
- B. Use cleaning materials that are nonhazardous.
- C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- F. Clean filters of operating equipment.
- G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
- H. Clean site; sweep paved areas, rake clean landscaped surfaces.
- I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.
- J. Clean Owner-occupied areas of work.

### **3.13 CLOSEOUT PROCEDURES**

- A. Make submittals that are required by governing or other authorities.
  - 1. Provide copies to Architect and Owner.
- B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- E. Owner will occupy all of the building as specified in Section 01 10 00.
- F. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- G. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- H. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- I. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

### **3.14 MAINTENANCE**

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

**END OF SECTION**

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**SECTION 01 74 19  
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

**PART 1 GENERAL**

**1.01 WASTE MANAGEMENT REQUIREMENTS**

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Owner may decide to pay for additional recycling, salvage, and/or reuse based on Landfill Alternatives Proposal specified below.
- E. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, incineration, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.
- F. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.
- G. The following sources may be useful in developing the Waste Management Plan:
  - 1. State Recycling Department, at location nearest to project.
- H. Methods of trash/waste disposal that are not acceptable are:
  - 1. Burning on the project site.
  - 2. Burying on the project site.
  - 3. Dumping or burying on other property, public or private.
  - 4. Other illegal dumping or burying.
- I. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 30 00 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. Section 01 50 00 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.
- C. Section 01 60 00 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
- D. Section 01 70 00 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

**1.03 DEFINITIONS**

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

#### 1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Landfill Alternatives Proposal: Within 10 calendar days after receipt of Notice of Award of Bid, or prior to any trash or waste removal, whichever occurs sooner, submit a projection of trash/waste that will require disposal and alternatives to landfilling, with net costs.
  - 1. Submit to Architect for Owner's review and approval.
  - 2. If Owner wishes to implement any cost alternatives, the Contract Price will be adjusted as specified elsewhere.
  - 3. Include an analysis of trash/waste to be generated and landfill options as specified for Waste Management Plan described below.
  - 4. Describe as many alternatives to landfilling as possible:
    - a. List each material proposed to be salvaged, reused, or recycled.
    - b. List the proposed local market for each material.
    - c. State the estimated net cost resulting from each alternative, after subtracting revenue from sale of recycled or salvaged materials and landfill tipping fees saved due to diversion of materials from the landfill.
  - 5. Provide alternatives to landfilling for at least the following materials:
    - a. Aluminum and plastic beverage containers.
    - b. Corrugated cardboard.
    - c. Wood pallets.

- d. Clean dimensional wood.
  - e. Land clearing debris, including brush, branches, logs, and stumps.
  - f. Concrete.
  - g. Bricks.
  - h. Concrete masonry units.
  - i. Precast concrete panels.
  - j. Asphalt paving.
  - k. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
  - l. Paint.
  - m. Fluorescent lamps (light bulbs).
- C. Once Owner has determined which of the landfill alternatives addressed in the Proposal above are acceptable, prepare and submit Waste Management Plan; submit within 10 calendar days after notification by Architect.
- D. Waste Management Plan: Include the following information:
- 1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
  - 2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
  - 3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
  - 4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
  - 5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
  - 6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.
- E. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
- 1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
  - 2. Submit Report on a form acceptable to Owner.
  - 3. Landfill Disposal: Include the following information:
    - a. Identification of material.
    - b. Amount, in tons or cubic yards, of trash/waste material from the project disposed of in landfills.
    - c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
    - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
  - 4. Incinerator Disposal: Include the following information:
    - a. Identification of material.
-

- b. Amount, in tons or cubic yards, of trash/waste material from the project delivered to incinerators.
- c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
- d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
5. Recycled and Salvaged Materials: Include the following information for each:
  - a. Identification of material, including those retrieved by installer for use on other projects.
  - b. Amount, in tons or cubic yards, date removed from the project site, and receiving party.
  - c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
  - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
  - e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
6. Material Reused on Project: Include the following information for each:
  - a. Identification of material and how it was used in the project.
  - b. Amount, in tons or cubic yards.
  - c. Include weight tickets as evidence of quantity.
7. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

## **PART 2 PRODUCTS**

### **2.01 PRODUCT SUBSTITUTIONS**

- A. See Section 01 60 00 - Product Requirements for substitution submission procedures.
- B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 01 60 00:
  1. Relative amount of waste produced, compared to specified product.
  2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Price.
  3. Proposed disposal method for waste product.
  4. Markets for recycled waste product.

## **PART 3 EXECUTION**

### **3.01 WASTE MANAGEMENT PROCEDURES**

- A. See Section 01 10 00 for list of items to be salvaged from the existing building for relocation in project or for Owner.
- B. See Section 01 30 00 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- C. See Section 01 50 00 for additional requirements related to trash/waste collection and removal facilities and services.
- D. See Section 01 60 00 for waste prevention requirements related to delivery, storage, and handling.
- E. See Section 01 70 00 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.



### 3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
  - 1. Prebid meeting.
  - 2. Preconstruction meeting.
  - 3. Regular job-site meetings.
- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
  - 1. Provide containers as required.
  - 2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
  - 3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
- H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
- I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

**END OF SECTION**

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**SECTION 01 78 00  
CLOSEOUT SUBMITTALS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Individual Product Sections: Specific requirements for operation and maintenance data.
- C. Individual Product Sections: Warranties required for specific products or Work.

**1.03 SUBMITTALS**

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
  - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
  - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
  - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
  - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
  - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
  - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
  - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PROJECT RECORD DOCUMENTS**

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
  - 1. Drawings.
  - 2. Specifications.
  - 3. Addenda.
  - 4. Change Orders and other modifications to the Contract.
  - 5. Reviewed shop drawings, product data, and samples.
  - 6. Manufacturer's instruction for assembly, installation, and adjusting.

- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
  - 1. Manufacturer's name and product model and number.
  - 2. Product substitutions or alternates utilized.
  - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
  - 1. Measured depths of foundations in relation to finish first floor datum.
  - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
  - 4. Field changes of dimension and detail.
  - 5. Details not on original Contract drawings.

### **3.02 OPERATION AND MAINTENANCE DATA**

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

### **3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES**

- A. For Each Product, Applied Material, and Finish:
  - 1. Product data, with catalog number, size, composition, and color and texture designations.
  - 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

### **3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS**

- A. For Each Item of Equipment and Each System:
  - 1. Description of unit or system, and component parts.

2. Identify function, normal operating characteristics, and limiting conditions.
  3. Include performance curves, with engineering data and tests.
  4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
  - C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
  - D. Include color coded wiring diagrams as installed.
  - E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
  - F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
    1. Include HVAC outdoor and exhaust air damper calibration strategy.
      - a. Include provisions which ensure that full closure of dampers can be achieved.
    2. Include Carbon Dioxide Monitoring Protocol.
    3. Include Carbon Monoxide Monitoring Protocol.
    4. Include Frost Mitigation Strategy for ventilation heat-recovery system.
  - G. Provide servicing and lubrication schedule, and list of lubricants required.
  - H. Include manufacturer's printed operation and maintenance instructions.
  - I. Include sequence of operation by controls manufacturer.
  - J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
  - K. Provide control diagrams by controls manufacturer as installed.
  - L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
  - M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
  - N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
  - O. Include test and balancing reports.
  - P. Additional Requirements: As specified in individual product specification sections.

### **3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS**

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
  - 1. Project Directory.
  - 2. Table of Contents, of all volumes, and of this volume.
  - 3. Operation and Maintenance Data: Arranged by system, then by product category.
    - a. Source data.
    - b. Operation and maintenance data.
    - c. Field quality control data.
    - d. Photocopies of warranties and bonds.
  - 4. Design Data: To allow for addition of design data furnished by Architect or others, provide a tab labeled "Design Data" and provide a binder large enough to allow for insertion of at least 20 pages of typed text.

### **3.06 WARRANTIES AND BONDS**

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

**END OF SECTION**

**SECTION 01 79 00  
DEMONSTRATION AND TRAINING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Demonstration of products and systems where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance is required for:
  - 1. All software-operated systems.
  - 2. HVAC systems and equipment.
  - 3. Plumbing equipment.
  - 4. Electrical systems and equipment.
  - 5. Conveying systems.
  - 6. Landscape irrigation.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 78 00 - Closeout Submittals: Operation and maintenance manuals.
- B. Section 01 91 13 - General Commissioning Requirements: Additional requirements applicable to demonstration and training.
- C. Other Specification Sections: Additional requirements for demonstration and training.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Training Plan: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
  - 1. Submit to Architect for transmittal to Owner.
  - 2. Submit not less than four weeks prior to start of training.
  - 3. Revise and resubmit until acceptable.
  - 4. Provide an overall schedule showing all training sessions.
  - 5. Include at least the following for each training session:
    - a. Identification, date, time, and duration.
    - b. Description of products and/or systems to be covered.
    - c. Name of firm and person conducting training; include qualifications.
    - d. Intended audience, such as job description.
    - e. Objectives of training and suggested methods of ensuring adequate training.
    - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
    - g. Media to be used, such as slides, hand-outs, etc.
    - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
  - 1. Include applicable portion of O&M manuals.
  - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
  - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.
- D. Training Reports:

1. Identification of each training session, date, time, and duration.
2. Sign-in sheet showing names and job titles of attendees.
3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.

#### **1.04 QUALITY ASSURANCE**

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
  1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
  2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

### **PART 2 PRODUCTS - NOT USED**

### **PART 3 EXECUTION**

#### **3.01 DEMONSTRATION - GENERAL**

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstration may be combined with Owner personnel training if applicable.
- C. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
  1. Perform demonstrations not less than two weeks prior to Substantial Completion.
  2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
  1. Perform demonstrations not less than two weeks prior to Substantial Completion.

#### **3.02 TRAINING - GENERAL**

- A. Conduct training on-site unless otherwise indicated.
- B. Owner will provide classroom and seating at no cost to Contractor.
- C. Provide training in minimum two hour segments.
- D. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- E. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
  1. The location of the O&M manuals and procedures for use and preservation; backup copies.
  2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
  3. Typical uses of the O&M manuals.
- F. Product- and System-Specific Training:
  1. Review the applicable O&M manuals.



2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
  3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
  4. Provide hands-on training on all operational modes possible and preventive maintenance.
  5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
  6. Discuss common troubleshooting problems and solutions.
  7. Discuss any peculiarities of equipment installation or operation.
  8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
  9. Review recommended tools and spare parts inventory suggestions of manufacturers.
  10. Review spare parts and tools required to be furnished by Contractor.
  11. Review spare parts suppliers and sources and procurement procedures.
- G. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

**END OF SECTION**

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SECTION 03 10 00

CONCRETE FORMS AND ACCESSORIES

PART 1. GENERAL

1.01 DESCRIPTION

A. Scope

This section describes the design, construction, erection, and handling of concrete forms for cast-in-place concrete.

1.02 QUALITY ASSURANCE

A. Design Criteria

1. The design of concrete formwork is solely the responsibility of the Contractor.
2. Conform to ACI 347, "Recommended Practice for Concrete Formwork", regarding the design loads, lateral pressures, wind loads, and design stresses.

B. Allowable Tolerances

1. The maximum deflection of formwork for surfaces exposed to view is 1/240 of the span between supports. Camber formwork where necessary to compensate for anticipated deflections in formwork due to loads imposed by fresh concrete and construction loads.
2. The maximum allowable deviation from a true plane is 1/8" in 6' for all exposed surfaces.
3. The maximum deviation from a true circle for circular structures is  $\pm 1/4$ " when measured at the edge of each form.
4. The maximum allowable deviation from any Plan dimensions is  $\pm 1/4$ ".

C. Reference Standards

1. "Recommended Practice for Concrete Formwork", ACI 347.
2. "Building Code Requirements for Reinforced Concrete Structures", ACI 318.
3. "Specifications for Structural Concrete Building", ACI 301.

1.03 SUBMITTALS

- A. Submit a description of the forming system to be used, including form type and description of form ties, to the Engineer for review.
- B. Submit detailed plans of the forming layout for any structure if directed by the Engineer. If such plans appear inadequate, the Engineer will recommend to the

Contractor such changes as he deems necessary. The Engineer's concurrence shall in no way relieve the Contractor of his responsibility for obtaining satisfactory results or his responsibility for damages or injury resulting from the use of such forming plans.

#### 1.04 HANDLING AND STORAGE

- A. Handle all forming materials with care while erecting, removing, and storing.
- B. When forms are not in use, stack neatly to prevent damage from moisture or other environmental conditions.

### PART 2. PRODUCTS

#### 2.01 MATERIALS

- A. Prefabricated Forms – Steel framed plywood, steel framed fiberboard, or steel.
- B. Plywood – Product Standard PS-1, waterproof, resin bonded, exterior fir; Grade B or better for face adjacent to concrete.
- C. Fiberboard – Fed. Spec. LLL-B-810 Type IX, tempered waterproof, concrete form hardboard.
- D. Lumber – Straight, uniform, free from holes, dents, or other surface defects.
- E. Chamfer Strips – Commercially manufactured chamfer strips of molded plastic or PVC. Use one style throughout the project. Surface against concrete planed smooth; 45° chamfer strip with minimum cross section dimension of ¾".
- F. Form Ties – Steel, removable end, permanently embedded type. Furnish spreader cones such that no metal from the tie remains closer than 1½" from the formed surface after the forms are removed.
- G. Rustication and Score Line Strips – PVC.

#### 2.02 FABRICATION AND MANUFACTURE

- A. All forms shall be fabricated or manufactured to be sufficiently tight to prevent leakage of mortar and to be easily aligned to prevent offsets. Warped or bent forms or frames will not be acceptable.
- B. Construct forms so they may be easily removed without damaging concrete surfaces.
- C. Provide positive means of adjustment of shores and struts by use of wedges or jacks.

- D. Forms shall be sufficiently rigid to prevent displacement or sagging during concrete placement.

## PART 3. EXECUTION

### 3.01 INSPECTION

- A. Inspect all forms for warps, bent frames, damaged plywood or fiberboard and remove damaged forms from the jobsite.
- B. Examine surfaces to which forms may be connected or may abut before beginning erection of forms. Correct any defects and deviations in these surfaces before erecting forms.

### 3.02 PREPARATION

- A. Field Measurements  
Lay out all necessary dimensions required to establish proper placement of forms. Use string lines, chalk lines, or other suitable aids to establish lines and grades for form-setters. Check all dimensions of erected formwork before placing concrete.
- B. Clean forms before beginning erection.
- C. Lubricate with approved commercially prepared form lubricant, all portions of the form which will be in direct contact with concrete.

### 3.03 ERECTION

- A. Erect all forms in such a manner as to be true to line, dimension, and elevations shown on the Plans, to be rigidly braced and unyielding, and to be completely mortar tight.
- B. Install walers, studs, internal ties, and other form supports, adequately spaced so proper working stresses are not exceeded.
- C. Provide temporary openings in wall and column forms to facilitate cleaning, inspection, and placing of concrete.
- D. Forms for concrete normally exposed to view
  1. Lay forms out in a regular and uniform pattern with the long dimension of the panels vertical with all joints aligned. Flat segmental forms may be used for forming curved surfaces 25' in diameter or larger.
  2. Do not use any forms which have offsets, ridges, concave, or convex surfaces.

3. Use new, or like new, forms for all surfaces normally exposed to view and to a point one foot below finish grade.

Steel forms shall be square and true and have no dents or deviations from a true plane exceeding  $\frac{1}{8}$ ".

4. Wherever the top of a wall is to be exposed to view, bring the top of at least one side of the forms to proper line and grade so the top of the wall can be finished with a screed or template.
- E. Install chamfer strips for all exposed corners.

### 3.04 FALSEWORK

#### A. General Requirements

All falsework shall be designed and constructed so that no excessive settlement or deformation will occur, and so that the necessary rigidity will be provided.

#### B. Design Loads

For calculating the loads on falsework, a weight of 150-lbs. per cubic foot shall be assumed for concrete plus a live load of 50-lbs. per square foot of horizontal surface for the forms.

#### C. Materials

All timber used in falsework shall be sound, in good condition, and free from defects which will impair its strength. Steel members shall be of adequate strength and of such shape as to be suitable for the purpose intended.

#### D. Workmanship

Sills or timber grillages used to support falsework columns, (unless founded on solid rock, shale, or other hard materials) shall be placed in excavated pits and

backfilled to prevent softening of the supporting material by drip from the forms or by rains that may occur during construction process. Footings or grillages shall be of ample size to support superimposed loads without settlement. Falsework which cannot be founded on a satisfactory spread footing shall be supported on piling driven to a bearing capacity sufficient to support the superimposed load without settlement. In general, each falsework bent shall be capped transversely at the proper elevation by a cap of adequate size. If desired by the Contractor, a short cap section forming a T-head may be substituted at the top of each pile or column and shall be set at the proper elevation to produce, in conjunction with the use of approved hardwood wedges or jacks, permanent camber indicated on the Plans or specified, plus a construction camber covering allowance for deformation of the forms and falsework. The use of wedges to compensate for incorrectly cut bearing surfaces will not be permitted. Wedges shall be used in pairs and shall be so arranged as to ensure uniform bearing. Each falsework bent shall be of ample size to provide the stiffness required. The bracing shall be securely spiked or bolted to each pile or column it may cross.

### 3.05 FIELD QUALITY CONTROL

- A. Before placing concrete, check all shores, struts, jacks, connections, and ties for tightness and rigidity.
- B. Check all forms for alignment and for conformance to Plan dimensions.

### 3.06 REMOVAL OF FORMS

- A. Formwork for beam soffits, structural slabs, and other parts that support the weight of concrete may be removed only after compression tests of field cylinders indicate the concrete has obtained 85% of the specified 28-day strength.
- B. In general, form or shores for supported slabs shall not be removed until the concrete, so supported, has acquired 70% of its design strength; except where the loads other than the dead weight of the concrete are added, the shores shall not be removed until 24-hours after the concrete has obtained 90% of its design strength. Forms shall be removed immediately after expiration of the lapsed time specified below or sooner, if required by the Engineer, where concrete is to receive a rubbed finish.
- C. Forms shall not be removed before the minimum times given below, or longer if job control test indicate the concrete has not attained strength specified below, except when specifically authorized by the Engineer.

Beams and Slabs	14 days
Walls up to 12" thick and vertical surfaces	3 days
Columns	5 days
Walls greater than 12" thick	7 days

END OF SECTION



**SECTION 03 20 00  
CONCRETE REINFORCING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 04 26 13 - Masonry: Spacing for veneer anchor reglets recessed in concrete.

**1.03 REFERENCE STANDARDS**

- A. ACI 301 - Specifications for Structural Concrete; 2016.
- B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
- C. ACI SP-66 - ACI Detailing Manual; 2004.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2020.
- E. ASTM A996/A996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement; 2016.
- F. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.
- G. CRSI (DA4) - Manual of Standard Practice; 2023.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
- C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

**PART 2 PRODUCTS**

**2.01 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
  - 1. Deformed billet-steel bars.
  - 2. Unfinished.
- B. Reinforcing Steel: Deformed bars, ASTM A996/A996M Grade 40 (280), Type A.
- C. Steel Welded Wire Reinforcement (WWR): Plain type; ASTM A1064/A1064M.
  - 1. Form: Flat Sheets.
  - 2. WWR Style: As indicated on drawings.
- D. Reinforcement Accessories:
  - 1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
  - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

3. Provide stainless steel components for placement within 1-1/2 inches of weathering surfaces.

## **2.02 FABRICATION**

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
- B. Welding of reinforcement is not permitted.

## **PART 3 EXECUTION**

### **3.01 PLACEMENT**

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.
- D. Comply with applicable code for concrete cover over reinforcement.

### **3.02 FIELD QUALITY CONTROL**

- A. An independent testing agency, as specified in Section 01 40 00 - Quality Requirements, will inspect installed reinforcement for compliance with contract documents before concrete placement.

**END OF SECTION**

SECTION 03 25 10

CONSTRUCTION JOINTS AND WATERSTOPS

PART 1. GENERAL

1.01 SCOPE

A. General

This section covers construction joints, expansion joints, and placement of waterstops.

B. Placement

Waterstops shall be installed in all construction joints with water or liquid on at least on one side of joint and at other locations required by the plans. All waterstops shall be continuous throughout their length.

1.02 SUBMITTALS

A. Submit a catalogue brochure of the waterstop to be used showing dimension and configuration in accordance with Section 01330.

PART 2. PRODUCTS

2.01 WATERSTOPS

A. PVC Waterstop

1. All waterstops shall be of "Rib Type" with a center bulb, capable of resisting a maximum pressure load of 65' of water.
2. Approved Manufacturers
  - a. Serviced Products Division, W.R. Grace and Company.
  - b. B.F. Goodrich.
  - c. Vinyltex Corporation.
  - d. Saf-T-Grip Specialties Corporation.
  - e. Vinyl-stops by Sonneborn-Contech.

3. All waterstops shall be 3/16" nominal thickness and 6" wide with 1" center bulb.

B. Adhesive Waterstops

1. Meet or exceed all requirements of Federal Specifications SS-S-00210, "Sealing Compound, Preformed Plastic for Expansion Joints," Type I or Type II. Plastic waterstop shall be equal to Synko-Flex as manufactured by Synko-Flex Products Company, Houston, Texas.
2. The plastic waterstop shall be produced from blends of refined hydrocarbon resins and plasticizing compounds reinforced with inert material filler, and shall contain no solvents, irritating fumes or obnoxious odors. The plastic waterstop shall not depend on oxidizing, evaporating or chemical action for its adhesive or cohesive strength. It shall be supplied in extruded form of suitable cross-section and of a size to seal the joint areas of concrete sections. The plastic waterstop shall be protected by a suitable, removable, two-piece wrapper. The two-piece wrapper shall be so designed that one-half may be removed longitudinally without disturbing the other half, to facilitate application of the sealing compound.

## 2.02 EXPANSION JOINTS

A. General

Expansion joints of the size and type shown on the Plans, or specified herein, shall be placed in concrete pavement or structure as shown on the Plans.

B. Preformed Asphalt Fiber Joint Material

Asphalt fiber sheet filler shall consist of preformed strips of inert material impregnated with asphalt. It shall be of the thickness shown on the Plans or indicated in these Specifications.

1. The sheet filler shall conform to the requirements of AASHTO Specification M-59 with the following additional provisions.
2. The sheet filler shall be of such character that it will not be deformed by ordinary handling during hot weather nor become hard and brittle in cold weather. It shall be of a tough, resilient, durable material not affected by weathering.

C. Hot Poured Rubberized Tar Joint Sealer

Hot poured rubberized mastic sealer shall consist of a mixture of durable, elastic rubber, coal tar pitch, and other materials which will form a resilient and adhesive compound capable of effectively sealing concrete joint surfaces against repeated expansion and contraction. The material shall be installed in accordance with the manufacturer's directions.

2.03 CONSTRUCTION JOINTS

A. General

Location of all construction joints shall be approved by the Engineer.

1. Maximum length of wall pours shall be 40' provided with construction joints or as shown on the plans.
2. Bottom slabs and wall footings for concrete structures that will hold water shall be poured monolithically without cold joints or other discontinuities or weakened areas.
3. Radial control joints consisting of 1/2" to 3/4" wide troweled grooves shall be required at 60° increments in circular slabs. Such joints shall be caulked with epoxy joint sealer after the concrete is cured and prior to placement of grout topping if used.
4. All cracks greater than 0.05" wide not located in control joints shall be sealed by cutting a bevel groove on the water side of the crack 1/2" to 3/4" wide and caulking with epoxy sealant. Crack widths shall be measured at the concrete surface.

PART 3. EXECUTION

3.01 INSTALLATION OF WATERSTOPS

- A. Install waterstops such that one-half of the width will be embedded on one side of the joint and one-half in the other. Secure the waterstop in position using a method insuring the waterstop will be held securely and in straight alignment; do not allow the waterstop to come in contact with reinforcing steel.
- B. Join all waterstops to form a continuous barrier to the passage of water, both in the same plane and at the intersection of different planes. Use splices designed for the specific purpose of joining PVC waterstops.

1. Joints in PVC waterstops shall be made by heating the two surfaces to be joined until the material has softened to the point where it is just short of being fluid, bring the two softened surfaces together with a slight rubbing motion followed by firm pressing so that a solid and tight bond is made.
2. The joints in strips of waterstop made in the above manner shall be such that the entire cross section of the joint is dense, homogeneous, and free of porosity. All finished joints shall have a tensile strength of not less than 75% of the base strip as extruded.
3. Heating of the surfaces to be joined shall be done by means of an electric splicing iron designed for this purpose and controlled by means of a voltage regulator.
4. Heat shall be regulated to prevent too rapid melting and charring of the waterstop material.
5. The Contractor shall provide jigs needed to make the joints in proper and workmanlike manner and in hold the strips so that alignment of joined strips is correct and angles are those required.
6. Inspect all joints prior to embedment, replace any defective joints.

C. Protect exposed waterstops from damage between concrete pours.

### 3.02 INSTALLATION OF ADHESIVE WATERSTOPS

- A. As soon as the form lumber is removed from the joint, brush the joint clean to remove all dust and foreign particles. Immediately apply one brush coat of prime recommended by the waterstop manufacturer.
- B. Remove one face of the protective paper and position in the center of the keyway, lapping strips one inch end to end to form a continuous homogeneous waterstop for the entire length of the section.
- C. Immediately before pouring concrete at the joint, completely clean the joint using brushes and compressed air to remove all debris. Only just before the concrete pour is made, remove the protective paper covering from the waterstop.

END OF SECTION

**SECTION 03 30 00  
CAST-IN-PLACE CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete formwork.
- B. Floors and slabs on grade.
- C. Joint devices associated with concrete work.
- D. Concrete curing.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 20 00 - Concrete Reinforcing.
- B. Section 03 35 11 - Concrete Floor Finishes: Densifiers, hardeners, applied coatings, and polishing.
- C. Section 07 92 00 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

**1.03 REFERENCE STANDARDS**

- A. ACI 117 - Specification for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
- B. ACI 211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide; 2022.
- C. ACI 301 - Specifications for Structural Concrete; 2016.
- D. ACI 302.1R - Guide to Concrete Floor and Slab Construction; 2015.
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
- F. ACI 305R - Guide to Hot Weather Concreting; 2010.
- G. ACI 306R - Guide to Cold Weather Concreting; 2016.
- H. ACI 308R - Guide to External Curing of Concrete; 2016.
- I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
- J. ACI 347R - Guide to Formwork for Concrete; 2014 (Reapproved 2021).
- K. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.
- L. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2023.
- M. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2020b.
- N. ASTM C150/C150M - Standard Specification for Portland Cement; 2020.
- O. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2016.
- P. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2023.
- Q. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).

- R. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2019.
- S. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2019, with Editorial Revision (2022).
- T. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2019.
- U. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2021.
- V. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2017.
- W. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.
- X. ASTM D2103 - Standard Specification for Polyethylene Film; 2023a.
- Y. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2018a.
- Z. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017.
- AA. NSF 61 - Drinking Water System Components - Health Effects; 2023, with Errata.
- BB. NSF 372 - Drinking Water System Components - Lead Content; 2022.

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
- C. Mix Design: Submit proposed concrete mix design.
  - 1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
  - 2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.
- D. Test Reports: Submit report for each test or series of tests specified.

#### **1.05 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.

### **PART 2 PRODUCTS**

#### **2.01 FORMWORK**

- A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.
- B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
  - 1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.



2. Earth Cuts: Do not use earth cuts as forms for vertical surfaces. Natural rock formations that maintain a stable vertical edge may be used as side forms.
3. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
4. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

## **2.02 REINFORCEMENT MATERIALS**

- A. Comply with requirements of Section 03 20 00.

## **2.03 CONCRETE MATERIALS**

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
  1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
  1. Acquire aggregates for entire project from same source.
- C. Fly Ash: ASTM C618, Class C or F.
- D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

## **2.04 ADMIXTURES**

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C260/C260M.
- C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
- D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
- E. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
- F. Water Reducing Admixture: ASTM C494/C494M Type A.

## **2.05 ACCESSORY MATERIALS**

- A. Underslab Vapor Retarder:
  1. Sheet Material: ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single ply polyethylene is prohibited. 10 mil thickness.
  2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
- B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
  1. Grout: Comply with ASTM C1107/C1107M.
  2. Minimum Compressive Strength at 28 Days, ASTM C109/C109M: 7500 pounds per square inch.

## **2.06 BONDING AND JOINTING PRODUCTS**

- A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
- B. Waterstops: Bentonite and butyl rubber, complying with NSF 61 and NSF 372.
  1. Configuration: As indicated on drawings.
  2. Size: As indicated on drawings.
  3. Manufacturers:

- a. CETCO, a division of Minerals Technologies Inc; WATERSTOP RX:  
www.mineralstech.com/#sle.
- b. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
- D. Slab Contraction Joint Device: Preformed linear strip intended for pressing into wet concrete to provide straight route for shrinkage cracking.
- E. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.

## 2.07 CURING MATERIALS

- A. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.
- B. Curing Agent, Water-Cure Equivalent Type: Clear, water-based, non-film-forming, liquid-water cure replacement agent.
  - 1. Compressive Strength of Treated Concrete: Equal to or greater than strength after 28-day water cure when tested according to ASTM C39/C39M.
- C. Curing Compound, Non-dissipating: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C309.
- D. Curing and Sealing Compound, Low Gloss: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C1315 Type 1 Class A.
- E. Moisture-Retaining Sheet: ASTM C171.
  - 1. Curing paper, regular.
  - 2. Polyethylene film, white opaque, minimum nominal thickness of 4 mil, 0.004 inch.
  - 3. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard.
- F. Polyethylene Film: ASTM D2103, 4 mil, 0.004 inch thick, clear.
- G. Water: Potable, not detrimental to concrete.

## 2.08 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- C. Normal Weight Concrete:
  - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 3500 pounds per square inch.
  - 2. Fly Ash Content: Maximum 20 percent of cementitious materials by weight.
  - 3. Water-Cement Ratio: Maximum 46 percent by weight.
  - 4. Total Air Content: 5 percent, determined in accordance with ASTM C173/C173M.
  - 5. Maximum Slump: 5 inches.
  - 6. Maximum Aggregate Size: 1.5 inch.

## 2.09 MIXING

- A. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- C. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
  - 1. Use latex bonding agent only for non-load-bearing applications.
- D. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

### **3.02 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Notify Architect not less than 24 hours prior to commencement of placement operations.
- D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- E. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- F. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.
- G. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

### **3.03 SLAB JOINTING**

- A. Locate joints as indicated on drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
- D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.

### **3.04 FLOOR FLATNESS AND LEVELNESS TOLERANCES**

- A. Maximum Variation of Surface Flatness:
  - 1. Exposed Concrete Floors: 1/8 inch in 10 feet.
  - 2. Under Seamless Resilient Flooring: 1/8 inch in 10 feet.
  - 3. Under Carpeting: 1/8 inch in 10 feet.
- B. Correct the slab surface if tolerances are less than specified.
- C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

### **3.05 CONCRETE FINISHING**

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
- C. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
  - 1. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

### **3.06 CURING AND PROTECTION**

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Surfaces Not in Contact with Forms:
  - 1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
  - 2. Final Curing: Begin after initial curing but before surface is dry.

### **3.07 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

### **3.08 DEFECTIVE CONCRETE**

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

**END OF SECTION**

SECTION 03 30 50

CONCRETE SIDEWALKS

PART 1. GENERAL

1.01 WORK INCLUDED

- A. Construction of concrete sidewalks.

1.02 RELATED WORK

- A. Section 01300 – Submittal Requirements
- B. Section 02950 – Site Restoration and Rehabilitation
- C. Section 03210 – Reinforcing Steel
- D. Section 03300 – Cast-in-Place Concrete.

1.03 REFERENCES

- A. Section 633 – Concrete Walks and Steps, Standard Specification for Highway Construction, Arkansas State Highway and Transportation Department.

PART 2. PRODUCTS

2.01 CONCRETE

- A. Comply with requirements of Section 03300.
- B. Four (4") inch maximum allowable slump.
- C. Do not exceed maximum water/cement ratio.

2.02 FORMS

- A. Constructed of metal or wood, free from warp, and of sufficient strength to resist springing during placement of concrete.

2.03 EXPANSION JOINTS

- A. Joint filler to comply with AASHTO M213.

PART 3. EXECUTION

3.01 SUBGRADE

- A. Excavate or fill, as required, to required grade.
- B. Remove soft and yielding material and replace with suitable material.
- C. Compact entire subgrade with approved mechanical equipment.

3.02 FORMS

- A. Clean and oil prior to placement of concrete.
- B. Securely stake, brace, and set to hold firmly to the required line and grade.

3.03 EXPANSION JOINTS

- A. Leave minimum 1/2" wide space between sidewalk and adjacent structures.
- B. Leave no space between sides of walk and adjacent curbs.

3.04 PLACING AND FINISHING

- A. Deposit concrete in the form upon wetted subgrade to such depth that when it is compacted and finished, the top shall be at the required elevation.
- B. Thoroughly consolidate concrete and spade edges to prevent honeycombing.
- C. Strike off top with a straightedge and tamp or vibrate to flush mortar to the surface. Provide broom finish.
- D. Round edges with a 1/4" radius, including edges at joints.
- E. Cut transverse joints in walk with a 1/4" jointer at intervals not greater than the width of the walk.
- F. Do not use curing compounds.

3.05 BACKFILLING

- A. After removal of forms, backfill spaces on each side of walk with suitable material.
- B. Firmly compact with approved mechanical equipment.
- C. Neatly grade backfill.

END OF SECTION

**SECTION 03 35 11  
CONCRETE FLOOR FINISHES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surface treatments for concrete floors and slabs.
- B. Clear coatings.
- C. Clear penetrating sealers.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with concrete floor placement and concrete floor curing.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's published data on each finishing product, including information on compatibility of different products and limitations.
- C. Maintenance Data: Provide data on maintenance and renewal of applied finishes.
- D. Warranty Documentation: Manufacturer warranty; ensure that forms have been completed in Owner's name and registered with manufacturer.
- E. Manufacturer's Installation Instructions.

**1.05 QUALITY ASSURANCE**

- A. Installer with a minimum of 5 years experience in performing work of this Section who has specialized in installation of work similar to that required for this project.
- B. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction and approving application method.
- C. Preinstallation Meetings: Conduct a preinstallation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Review the following:
  - 1. Environmental requirements.
  - 2. Scheduling and phasing of work.
  - 3. Coordinating with other work and personnel. Remind all trades that they are working on a surface that is to become a finished surface.
  - 4. Protection of adjacent surfaces.
  - 5. Surface preparation.
  - 6. Repair of defects and defective work prior to installation.
  - 7. Cleaning.
  - 8. Installation of polished floor finishes.
  - 9. Application of liquid hardener, densifier.
  - 10. Protection of finished surfaces after installation.
  - 11. Do not place any materials on the concrete surface that may cause staining, etching or scratching.

### **1.06 MOCK-UP**

- A. For coatings, construct mock-up area under conditions similar to those that will exist during application, with coatings applied.
- B. Mock-up will be used to judge workmanship, concrete substrate preparation, operation of equipment, material application, color selection and shine.
- C. Mock-Up Size: 10 feet square.
- D. Locate where directed.
- E. Mock-up may remain as part of the work.
- F. Mock up to show specified level of gloss level when concrete is mechanically processed:
  - 1. Level 1 Sheen, Flat Appearance as determined by a gloss reading of 0 – 10. (100 grit).
  - 2. Level 2 Sheen, Satin (Matte appearance, with or without slight diffused light) as determined by a gloss reading of 10 – 25 (100 – 400 grit).
  - 3. Level 3 Sheen Semi-Polished ( Medium High Reflective ) as determined by a gloss reading of 25 – 70 (400 – 800 grit).
  - 4. Level 4 Sheen Highly polished (Sharp, crisp reflections, very high gloss) as determined by a gloss reading of 70 or higher (800 or higher grit).

### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials in manufacturer's sealed packaging, including application instructions.
- B. Protect Concrete Slab:
  - 1. Protect from petroleum stains during construction.
  - 2. Diaper hydraulic power equipment.
  - 3. Restrict vehicular parking.
  - 4. Restrict use of pipe cutting machinery.
  - 5. Restrict placement of reinforcing steel and storage of other ferrous metals on concrete surfaces.
  - 6. Restrict use of acids or acidic detergents on concrete surfaces.
  - 7. Restrict painting activities over concrete surfaces.

### **1.08 FIELD CONDITIONS**

- A. Maintain light level equivalent to a minimum 200 W light source at 8 feet above the floor surface over each 20 foot square area of floor being finished.
- B. Do not finish floors until interior heating system is operational.
- C. Maintain ambient temperature of 50 degrees F minimum.

### **1.09 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a two-year period commencing on the Date of Substantial Completion.
- C. Finish Warranty: Provide five-year manufacturer warranty against excessive degradation of finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

## **PART 2 PRODUCTS**

### **2.01 CONCRETE FLOOR FINISH APPLICATIONS**

- A. Unless otherwise indicated, all concrete floors are to be finished using polished concrete finish.
- B. Penetrating Clear Sealer:



1. Use at following locations: where indicated.

## **2.02 SURFACE TREATMENTS**

- A. Surface cutting aids, concrete repair materials, and pre-densifier concrete cleaners as recommended by floor finish manufacturer. Comply with national, state and district VOC regulations and regulations of these specifications.

## **2.03 DENSIFIERS AND HARDENERS**

- A. Liquid Densifier and Hardener: Penetrating chemical compound that reacts with concrete, filling the pores and dustproofing; for application to concrete after set.
  1. Composition: Lithium silicate.
  2. Products:
    - a. ARDEX Engineered Cements; ARDEX PC-50: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Kaufman Products Inc; SureHard LS: [www.kaufmanproducts.net/#sle](http://www.kaufmanproducts.net/#sle).
    - c. PROSOCO, Inc; Consolideck LS/CS: [www.prosoco.com/consolideck/#sle](http://www.prosoco.com/consolideck/#sle).
    - d. PROSOCO, Inc; Consolideck LS: [www.prosoco.com/consolideck/#sle](http://www.prosoco.com/consolideck/#sle).
    - e. PROSOCO, Inc; ColorHard used with Consolideck LS or LS/CS: [www.prosoco.com/consolideck/#sle](http://www.prosoco.com/consolideck/#sle).
    - f. SpecChem, LLC; LithSeal SC: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).

## **2.04 COATINGS**

- A. High Gloss Clear Coating: Transparent, non-yellowing, water- or solvent-based coating.
  1. Coatings must be compatible with Densifier / Hardener.
  2. Composition: Acrylic polymer-based.
  3. Nonvolatile Content: 15 percent, minimum, when measured by volume.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that floor surfaces are acceptable to receive the work of this section.
- B. Verify that flaws in concrete have been patched and joints filled with methods and materials suitable for further finishes.
- C. Do not begin installation until unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

### **3.02 GENERAL**

- A. Apply materials in accordance with manufacturer's instructions.

### **3.03 COATING APPLICATION AND PREPARATION**

- A. Verify that surface is free of previous coatings, sealers, curing compounds, water repellents, laitance, efflorescence, fats, oils, grease, wax, soluble salts, residues from cleaning agents, and other impediments to adhesion.
- B. Clean dirt, dust, oil, grease and other contaminants that interfere with penetration or performance of specified product from surfaces. Use appropriate concrete cleaners approved by the concrete surface treatment manufacturer where necessary. Rinse thoroughly using pressure water spray to remove cleaner residues. Allow surfaces to dry completely before application of product.
- C. Verify that water vapor emission from concrete and relative humidity in concrete are within limits established by coating manufacturer.

- D. Protect adjacent non-coated areas from drips, overflow, and overspray; immediately remove excess material. If product is accidentally misapplied to adjacent surfaces, flush with water immediately before material dries.
- E. Apply coatings in accordance with manufacturer's instructions, matching approved mock-ups for color, special effects, sealing and workmanship.
- F. Repair, patch and fill cracks, voids, defects and damaged areas in surface as approved by the Architect. Allow repair materials to cure completely before application of product.
- G. Variations in substrate texture and color will affect final appearance and should be corrected prior to application of sealer/hardener system and the polishing steps.
- H. Avoid contact in areas not to be treated. Avoid contact with metal, glass and painted surfaces.
- I. Seal open joints in accordance with Section 07 90 00.
- J. Apply specified sealants and caulking and allow complete curing before application of penetrating concrete hardener/densifier.
- K. Do not proceed until unsatisfactory conditions have been corrected.

**END OF SECTION**

**SECTION 04 26 13  
MASONRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete block.
- B. Concrete facing brick.
- C. Mortar and grout.
- D. Reinforcement and anchorage.
- E. Flashings.
- F. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 92 00 - Joint Sealants: Sealing control and expansion joints.

**1.03 REFERENCE STANDARDS**

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2020.
- C. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2016, with Editorial Revision (2018).
- D. ASTM C55 - Standard Specification for Concrete Building Brick; 2017.
- E. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2016a.
- F. ASTM C91/C91M - Standard Specification for Masonry Cement; 2018.
- G. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2017.
- H. ASTM C150/C150M - Standard Specification for Portland Cement; 2020.
- I. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
- J. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019.
- K. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2018.
- L. ASTM C476 - Standard Specification for Grout for Masonry; 2020.
- M. ASTM C744 - Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units; 2016.
- N. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.
- O. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls; 2005.
- P. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2017.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week before starting work of this section.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, and mortar.

- C. Samples: Submit four samples of concrete facing brick units to illustrate color, texture, and extremes of color range.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- C. **Certifications:** The Specified Megastone units are solid non-load bearing concrete masonry units with Burnished Faces with one or more faces or ends ground using a minimum three-stage vertical spindle/ polishing machine to expose carefully selected aggregates. Units are manufactured by means of moisture controlled curing for 24 hours minimum. Burnished units are allowed to further cure for a minimum of 20 days before burnishing. Concrete blocks for finishing shall conform to ASTM C90 for Normal Weight. All units contain an integral water repellent CMU admixture at the time of manufacture. Burnished units are produced unsealed, but a manufacturer applied sacrificial sealer shall be applied. Units shall conform to ASTM C744 with respect to abrasion, crazing resistance, and color change.

#### **1.07 MOCK-UP**

- A. Construct a masonry wall as a mock-up panel sized 8 feet long by 6 feet high; include masonry veneer and mortar combination, coursing, bond, unit size ratio, accessories, and pattern in mock-up.
- B. Locate where directed.
- C. Retain mock-up during construction as a quality standard.
- D. Completely remove when work is accepted.
- E. Mock-up may not remain as part of the Work.

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, handle, and store masonry units by means that will prevent damage and contamination by other materials.
- B. Store in protected area and covered to ensure units remain dry and clean.
- C. Do not allow units to sit in standing water.
- D. Concrete veneer units shall be delivered on covered wood pallets in such a way as to protect faces.

### **PART 2 PRODUCTS**

#### **2.01 CONCRETE MASONRY / VENEER**

- A. Concrete Block: Comply with referenced standards and as follows:
  - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.
  - 2. Load-Bearing Units: ASTM C90, normal or light weight.
    - a. Hollow block, as indicated.
  - 3. Non-Loadbearing Units: ASTM C129.
    - a. Hollow block, as indicated.
    - b. Lightweight.
- B. Concrete Masonry Veneer:

1. Basis of Design: Brushed-Face Megastone Custom 4" Concrete Masonry Veneer as manufactured by Nettleton Concrete, Inc., Jonesboro, Arkansas; 800-382-2462.
  - a. Color: To be selected from full line.
  - b. Size: 4 x 12 x 24
  - c. Finish: Brushed-Face.
  - d. Masonry Cleaner: 222 Cast Stone and Burnished Masonry Cleaner for Burnished Face units, as manufactured by Diedrich Technologies, Inc., or approved equal. Do not apply cleaner with a pressure sprayer above 50 psi.
  - e. Water Repellent: Units are manufactured with RainBloc integrated integral water repellent, or approved equal.
  - f. Final Sealing: Bright Kure & Seal manufactured by TK Products, or approved equal.

## 2.02 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91/C91M Types N & S.
  1. Colored Mortar: Premixed cement as required to match Architect's color sample.
  2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
- C. Hydrated Lime: ASTM C207, Type S and Type N - Structural.
- D. Grout Aggregate: ASTM C404.
- E. Water: Clean and potable.
- F. Moisture-Resistant Admixture: Water repellent compound designed to reduce capillarity.

## 2.03 REINFORCEMENT AND ANCHORAGE

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) yield strength, deformed billet bars; uncoated.
- B. Joint Reinforcement Type: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.
- C. Joint Reinforcement Standard: ASTM A951/A951M.
  1. Type: Truss.
  2. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.
- D. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
  1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
  2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
  3. Vertical adjustment: Not less than 3-1/2 inches.
  4. Seismic Feature: Provide lip, hook, or clip on end of wire ties to engage or enclose not less than one continuous horizontal joint reinforcement wire of 0.1483 inch diameter.
- E. Metal-to-Metal Fasteners: Self-drilling, self-tapping screws; corrosion resistant finish or hot dip galvanized to ASTM A153/A153M.

## 2.04 FLASHINGS

- A. Membrane Asphaltic Flashing Materials:
  1. Rubberized Asphalt Flashing: Self-adhering polymer modified asphalt sheet; 40 mils (0.040 inch) minimum total thickness; 8 mil cross-laminated polyethylene bonded to

adhesive rubberized asphalt, with a removable release liner.

- a. Provide termination bar
- b. Manufacturers:
  - 1) Advanced Building Products, Inc: [www.advancedbuildingproducts.com/#sle](http://www.advancedbuildingproducts.com/#sle).
  - 2) Heckmann Building Products, Inc: [www.heckmannbuildingprods.com/#sle](http://www.heckmannbuildingprods.com/#sle)
  - 3) WIRE-BOND: [www.wirebond.com/#sle](http://www.wirebond.com/#sle).
  - 4) York Manufacturing, Inc; York Seal: [www.yorkmfg.com/#sle](http://www.yorkmfg.com/#sle).
  - 5) Substitutions: See Section 01 60 00 - Product Requirements.

- B. Flashing Sealant/Adhesives: Silicone, polyurethane, or silyl-terminated polyether/polyurethane, or other type required or recommended by flashing manufacturer; type capable of adhering to type of flashing used.
  1. Manufacturers, Synthetic Rubber Products:
    - a. Mortar Net Solutions; BTL-1 Butyl Sealant: [www.mortarnet.com/#sle](http://www.mortarnet.com/#sle).

## 2.05 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.
- C. Weeps:
  1. Type: Polyester mesh.
  2. Color(s): As selected by Architect from manufacturer's full range.
- D. Cavity Vents:
  1. Type: Polyester mesh.
- E. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
  1. Mortar Diverter: Panels installed at flashing locations.
- F. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

## 2.06 MORTAR AND GROUT MIXING

- A. Mortar for Unit Masonry: ASTM C270, Proportion Specification.
  1. Masonry below grade and in contact with earth; Type S.
  2. Exterior, non-loadbearing masonry; Type N.
  3. Interior, non-loadbearing masonry; Type N.
- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
- C. If Structural Drawings do not specify, provide all grout to comply with the following.
- D. Grout: ASTM C476; consistency as required to fill volumes completely for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.

- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

### 3.02 INSTALLATION

- A. Install concrete veneer units as part of unit masonry work. Always lay blocks from more than one pallet at a time during installation. Complete masonry construction using procedures and workmanship consistent with quality masonry practices.
- B. **Protection:** During erection, cover top of walls with waterproof sheeting at end of each day. Cover partially completed walls when work is not in progress. Extend cover 24 inches minimum down both sides and hold securely in place. Protect face of walls, sills, and other projections from roof run-off, splashed water, mud, grout, and mortar. Spread sand or straw at base of walls to minimize dirt and clay splashing onto Netbrick faces. Without damaging completed work, it is recommended to provide protective boards at exposed external corners which may be damaged by construction activities.

### 3.03 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Brick:
1. Bond: As indicated for different locations.
  2. Mortar Joints: Concave.

### 3.04 CUTTING

- A. Field cut veneer units with motor-driven masonry saws using an abrasive or diamond blade to provide straight true edges and avoid damage to face. Field split and chisel corners with suitable tools to insure uniform texture and consistency of face. Do not install chipped or broken units.

### 3.05 PLACING AND BONDING

- A. Refer to structural drawings for notes and details by structural engineer regarding Placing and Bonding.
- B. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- C. Lay hollow masonry units with face shell bedding on head and bed joints.
- D. All mortar joints should be tuckpointed for the appropriate appearance. For external applications, tuckpoint joints to control water penetration. Raked joints are not recommended for any application.
- E. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- F. Remove excess mortar as work progresses.
- G. Interlock intersections and external corners, except for units laid in stack bond.
- H. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- I. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- J. Isolate top joint of masonry veneer from horizontal structural framing members or support angles with compressible joint filler.

### 3.06 WEEPS/CAVITY VENTS

- A. Install weeps in veneer walls at 24 inches on center, or as recommended by manufacturer, horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.
- B. Install cavity vents in veneer walls at 32 inches on center horizontally below shelf angles and lintels, at top of walls, and at any water stops over windows, doors, and beams.

### 3.07 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.
- C. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

### 3.08 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 36 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- B. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- C. Seismic Reinforcement: Connect veneer anchors with continuous horizontal wire reinforcement before embedding anchors in mortar.
- D. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

### 3.09 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
  - 1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up at least 1 inch, minimum, to form watertight pan at non-masonry construction.
  - 2. Remove or cover protrusions or sharp edges that could puncture flashings.
  - 3. Seal lapped ends and penetrations of flashing before covering with mortar.
- B. Terminate flashing up 8 inches minimum on vertical surface of backing:
  - 1. Install vertical leg of flashing behind water-resistive barrier sheet over backing.
  - 2. Install vertical leg of flashing over fluid-applied or self-adhered air/vapor barriers over backing or per manufacturer's directions.
  - 3. Apply cap bead of sealant on top edge of self-adhered flashing.
- C. Install flashing in accordance with manufacturer's instructions, and where indicated on drawings and BIA Technical Notes No. 7.
- D. Extend metal flashings to within 1/4" inch of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.
- E. Extend plastic flashings to within 1/4" inch of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.
- F. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.



### 3.10 CONTROL AND EXPANSION JOINTS

- A. Provide control and expansion joints. Verify actual joint locations with Architect before installation.
- B. Do not continue horizontal joint reinforcement through control or expansion joints.
- C. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- D. Size control joints as indicated on drawings; if not indicated, 3/4 inch wide and deep.
- E. Form expansion joint as detailed on drawings.

### 3.11 TOLERANCES

- A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- E. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.

### 3.12 CUTTING AND FITTING

- A. Cut and fit for pipes and conduit. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

### 3.13 INSPECTION

- A. Faces of units exposed in finished work shall be of uniform color and texture and free of chips, cracks, or other imperfections detracting from appearance of the finished wall when viewed from a distance of fifteen (15) feet at right angles to the wall under normal lighting conditions.

### 3.14 CLEANING

- A. Exercise care that wet mortar is not splashed onto concrete veneer faces during installation. Excess or splashed mortar shall be cleaned from face with dry burlap wipe or masonry brush. Remove after mortar becomes hard enough not to smear but prior to mortar setting.
- B. Megastone Units: Clean completed wall surfaces using masonry cleaner such as 222 Cast Stone & Burnished Masonry Cleaner for Burnished Faces units, as manufactured by Diedrich Technologies, Inc. Dilute cleaning solution as recommended by manufacturer. Strictly follow manufacturer's cleaning instructions. Do not use acid or abrasives on finished surfaces. Do not powerwash. High pressure powerwashing may interfere with performance of the integral water repellent causing efflorescence.
- C. Netbrick Units: Clean completed wall surfaces using masonry cleaner such as Specialty Masonry Cleaner, as manufactured by Diedrich Technologies, Inc. Dilute cleaning solution as recommended by manufacturer. Strictly follow manufacturer's cleaning instructions. Do not use acid or abrasives on finished surfaces. Do not powerwash. High pressure powerwashing may interfere with performance of the integral water repellent causing efflorescence.
- D. Megastone Units: For Burnished Face finishes that have been cleaned, washed, and dried, apply a jobsite application of Bright Kure & Seal manufactured by TK Products or equivalent as directed by manufacturer's recommendations.

**3.15 PROTECTION AND MAINTENANCE**

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.
- B. Properly installed, cleaned, and sealed, needs virtually no maintenance other than routine cleaning with standard commercial grade cleaning agents. Contact manufacturer for specific cleaning recommendations.

**3.16 SCHEDULES**

- A. Refer to Drawings for locations of each type of masonry construction.

**END OF SECTION**

**SECTION 05 12 00  
STRUCTURAL STEEL FRAMING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Structural steel framing members.
- B. Grouting under base plates.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 31 00 - Steel Decking: Support framing for small openings in deck.
- B. Section 05 50 00 - Metal Fabrications: Steel fabrications affecting structural steel work.

**1.03 REFERENCE STANDARDS**

- A. AISC (MAN) - Steel Construction Manual; 2023.
- B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2022.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2020.
- E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021.
- G. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2019.
- H. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2015.
- I. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2007 (Reapproved 2013).
- J. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2022.
- K. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2019, with Editorial Revision (2020).
- L. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2019.
- M. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2020.
- N. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- O. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2014 (Amended 2015).
- P. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:

1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
  2. Connections not detailed.
  3. Indicate cambers.
  4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
- D. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

### **1.05 QUALITY ASSURANCE**

- A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."
- B. Fabricator: Company specializing in performing the work of this section with minimum 5 years of documented experience.
- C. Erector: Company specializing in performing the work of this section with minimum 5 years of documented experience.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Steel Angles and Plates: ASTM A36/A36M.
- B. Steel W Shapes and Tees: ASTM A992/A992M.
- C. Steel Shapes, Plates, and Bars: ASTM A529/A529M high-strength, carbon-manganese structural steel, Grade 50.
- D. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.
- E. Pipe: ASTM A53/A53M, Grade B, Finish black.
- F. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436/F436M washers.
- G. Tension Control Bolts: Twist-off type; ASTM F3125/F3125M.
- H. Unheaded Anchor Rods: ASTM F1554, Grade 36, plain, with matching ASTM A563 or ASTM A563M nuts and ASTM F436/F436M Type 1 washers.
- I. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
  1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
  2. Minimum Compressive Strength at 28 Days: 5000 pounds per square inch.
- J. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

### **2.02 FABRICATION**

- A. Shop fabricate to greatest extent possible.

### **2.03 FINISH**

- A. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.

## **PART 3 EXECUTION**

### **3.01 ERECTION**

- A. Erect structural steel in compliance with AISC 303.
- B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Field weld components indicated on shop drawings.
- D. Do not field cut or alter structural members without approval of Architect.
- E. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- F. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

### **3.02 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

### **3.03 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.

**END OF SECTION**

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**SECTION 05 31 00  
STEEL DECKING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Roof deck.
- B. Composite floor deck.
- C. Supplementary framing for openings up to and including 18 inches.
- D. Bearing plates and angles.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 12 00 - Structural Steel Framing: Support framing for openings larger than 18 inches and shear stud connectors.
- B. Section 05 21 00 - Steel Joist Framing: Placement of embedded steel anchors for bearing plates and joist seats in cast-in-place concrete.
- C. Section 05 50 00 - Metal Fabrications: Steel angle concrete stops at deck edges.

**1.03 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- C. ASTM A510/A510M - Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel; 2020.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- E. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.
- F. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2014 (Amended 2015).
- G. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.
- H. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.
- I. ICC-ES AC43 - Acceptance Criteria for Steel Deck Roof and Floor Systems; 2022.
- J. ICC-ES AC70 - Acceptance Criteria for Power-Actuated Fasteners Driven into Concrete, Steel and Masonry Elements; 2019, with Editorial Revision (2021).
- K. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007.
- L. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
- M. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.
- B. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.

- C. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.
- D. Certificates: Certify that products furnished meet or exceed specified requirements.
- E. Submit manufacturer's installation instructions.
- F. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

### **1.05 QUALITY ASSURANCE**

- A. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M and dated no more than 12 months before start of scheduled welding work.

### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Cut plastic wrap to encourage ventilation.
- B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

## **PART 2 PRODUCTS**

### **2.01 STEEL DECK**

- A. Roof Deck: Non-composite type, fluted steel sheet:
  - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G60/Z180 galvanized coating.
  - 2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
  - 3. Structural Properties:
    - a. Span Design: Double.
  - 4. Nominal Height: 1-1/2 inch.
  - 5. Profile: Fluted.
  - 6. Formed Sheet Width: 36 inch.
  - 7. Side Joints: Lapped, mechanically fastened.
  - 8. End Joints: Lapped, welded.
- B. Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete:
  - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
  - 2. Span Design: Double.
  - 3. Minimum Base Metal Thickness: 20 gauge, 0.0359 inch.
  - 4. Nominal Height: 2 inches.
  - 5. Profile: Fluted; SDI COMPOSITE.
  - 6. Formed Sheet Width: 24 inch.
  - 7. Side Joints: Lapped, welded.
  - 8. End Joints: Lapped, welded.

### **2.02 ACCESSORY MATERIALS**

- A. Bearing Plates and Angles: ASTM A36/A36M steel.
- B. Welding Materials: AWS D1.1/D1.1M.
- C. Fasteners: Galvanized hardened steel, self tapping.
- D. Powder Actuated Mechanical Fasteners: Steel; with knurled shank and forged ballistic point. Comply with applicable requirements of ICC-ES AC70.



1. Design Requirements: Provide number and type of fasteners that comply with the applicable requirements of SDI (DM) design method for roof deck and floor deck applications and ICC-ES AC43.
  2. Material: Steel; ASTM A510/A510M.
- E. Mechanical Fasteners: Steel; hex washer head, self-drilling, self-tapping.
1. Fasteners for Steel Roof Decks Protected with Waterproofing Membrane: ASTM B633, SC1, Type III zinc electroplate.
- F. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- G. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.
- H. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the deck.

### **2.03 FABRICATED DECK ACCESSORIES**

- A. Sheet Metal Deck Accessories: Metal closure strips and cover plates, 20 gauge, 0.0359 inch thick sheet steel; of profile and size as indicated; finished same as deck.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
- B. On steel supports provide minimum 1-1/2 inch bearing.
- C. At mechanically fastened male/female side laps fasten at 24 inches on center maximum.
- D. Drive mechanical sidelap connectors completely through adjacent lapped sheets; positively engage adjacent sheets with minimum three-thread penetration.
- E. At welded male/female side laps weld at 18 inches on center maximum.
- F. Weld deck in accordance with AWS D1.3/D1.3M.
- G. At deck openings from 6 inches to 18 inches in size, provide 2 by 2 by 1/4 inch steel angle reinforcement. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute.
- H. At deck openings greater than 18 inches in size, provide steel angle reinforcement. as specified in Section 05 12 00.
- I. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures.
- J. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
- K. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

**END OF SECTION**

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**SECTION 05 40 00  
COLD-FORMED METAL FRAMING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Formed steel stud exterior wall framing.

**1.02 RELATED REQUIREMENTS**

- A. Section 04 26 13 - Masonry: Veneer masonry supported by wall stud metal framing.
- B. Section 09 21 16 - Gypsum Board Assemblies: Lightweight, non-load bearing metal stud framing.
- C. Section 09 21 16 - Gypsum Board Assemblies: Gypsum-based sheathing.
- D. Section 09 51 00 - Acoustical Ceilings: Ceiling suspension system.

**1.03 REFERENCE STANDARDS**

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2018).
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- D. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members; 2018, with Editorial Revision.
- E. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2020.
- F. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.
- G. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.
- C. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
  - 1. Design data:
- D. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention .

**1.05 QUALITY ASSURANCE**

- A. Designer Qualifications: Design framing system under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.

- C. Manufacturer Qualifications: Member of Steel Stud Manufacturers Association (SSMA): [www.ssma.com/#sle](http://www.ssma.com/#sle).
- D. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

## **PART 2 PRODUCTS**

### **2.01 FRAMING SYSTEM**

- A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
- B. Design Requirements: Provide completed framing system having the following characteristics:
  - 1. Design: Calculate structural characteristics of cold-formed steel framing members according to AISI S100.
  - 2. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
  - 3. Design Loads: In accordance with applicable codes.
  - 4. Live load deflection meeting the following, unless otherwise indicated:
    - a. Exterior Walls: Maximum horizontal deflection under wind load of 1/180 of span.
  - 5. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
  - 6. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

### **2.02 FRAMING MATERIALS**

- A. Studs and Track: ASTM C955; studs formed to channel, C- or Sigma-shaped with punched web; U-shaped track in matching nominal width and compatible height.
  - 1. Gauge and Depth: As indicated on drawings.
  - 2. Galvanized in accordance with ASTM A653/A653M, G60/Z180 coating.
- B. Framing Connectors: Factory-made, formed steel sheet.
  - 1. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, shouldered screws or screws and anti-friction or stepped bushings, while maintaining structural performance of framing. Provide movement connections where indicated on drawings.
  - 2. Fixed Connections: Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, joist hangers, gusset plates, and stiffeners.
  - 3. Wall Stud Bridging Connections: Provide mechanical load-transferring devices that accommodate wind load torsion and weak axis buckling induced by axial compression loads. Provide bridging connections where indicated on the drawings.

### **2.03 FASTENERS**

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.
- B. Anchorage Devices: Powder actuated.
- C. Welding: Comply with AWS D1.1/D1.1M.

### **2.04 ACCESSORIES**

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.

- B. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION OF STUDS**

- A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
- B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 16 inches on center. Coordinate installation of sealant with floor and ceiling tracks.
- C. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- D. Install load-bearing studs full length in one piece. Splicing of studs is not permitted.
- E. Install load-bearing studs, brace, and reinforce to develop full strength and achieve design requirements.
- F. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
- G. Attach cross studs to studs for attachment of fixtures anchored to walls.
- H. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- I. Touch-up field welds and damaged galvanized surfaces with primer.

#### **3.02 TOLERANCES**

- A. Maximum Variation of any Member from Plane: 1/4 inch.

**END OF SECTION**

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**SECTION 05 44 00  
COLD-FORMED METAL TRUSSES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Light gauge cold-formed steel roof trusses.
- B. Anchorages, bracing, and bridging.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 40 00 - Cold-Formed Metal Framing: Light gauge structural metal studs, joists, and rafters.
- B. Section 06 10 00 - Rough Carpentry: Floor and roof sheathing.

**1.03 REFERENCE STANDARDS**

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2018).
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- C. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2009 (Reapproved 2015).
- D. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2014 (Amended 2015).
- E. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.
- F. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.
- G. CFSEI 5000 - Field Installation Guide for Cold-Formed Steel Roof Trusses; May 2000.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Meeting: Meet at project site prior to beginning of installation to review requirements. Require attendance by representatives of the following:
  - 1. Truss fabricator.
  - 2. Truss installer.
  - 3. Other entities affected by the work of this section, including but not limited to truss support framing installer, mechanical systems installer, and electrical systems installer.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Span charts.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings:
  - 1. Include detailed roof truss layout.
  - 2. Show member type, location, spacing, size and gauge, methods of attachment, and erection details. Indicate supplemental bracing, strapping, splices, bridging, and accessories.

3. Include truss design drawings, signed and sealed by a qualified professional engineer registered in the State in which the Project is located, verifying ability of each truss design to meet applicable code and design requirements.
- D. Designer's Qualification Statement.
- E. Fabricator's Qualification Statement.
- F. Installer's Qualification Statement.
- G. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated within the previous 12 months.

### **1.06 QUALITY ASSURANCE**

- A. Designer Qualifications: Design trusses under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver trusses and other materials in manufacturer's unopened bundles or containers, each marked with manufacturer's name, brand, type, and grade. Exercise care to avoid damage during unloading, storing, and erection.
- B. Store trusses on blocking, pallets, platforms, or other supports, off the ground and in an upright position, sufficiently braced to avoid damage from excessive bending. Gently slope stored trusses to avoid accumulation of water on interior of truss chord members.
- C. Protect trusses and accessories from contact with earth, corrosion, deformation, mechanical damage, or other deterioration when stored at project site.

## **PART 2 PRODUCTS**

### **2.01 TRUSS DESIGN REQUIREMENTS**

- A. Design: Calculate structural characteristics of cold-formed steel truss members according to AISI S100.
- B. Structural Performance: Design, engineer, fabricate, and erect trusses to withstand specified design loads for project conditions within required limits.
  1. Design Loads: In accordance with applicable codes.
  2. Deflections: Live load deflection meeting the following, unless otherwise indicated:
    - a. Roofs: Maximum vertical deflection under live load of 1/240 of span.
  3. Design trusses to accommodate movement attributable to temperature changes within a range of 120 degrees F without damage or overstressing, sheathing failure, undue strain on fasteners and anchors, or other deleterious effects.

### **2.02 COMPONENTS**

- A. Trusses: Light gauge steel assemblies providing a complete horizontal framing system for locations indicated, ready for deck installation.
  1. Truss Type, Span, and Height: As indicated on drawings.
  2. Chord and Web Members: Fabricate required shapes from commercial quality galvanized steel sheet complying with ASTM A653/A653M, with minimum yield strength of 40,000 psi; minimum G60/Z180 coating; gauges as required for load conditions; all edges rolled or closed.
- B. Fasteners: Self-drilling, self-tapping screw fasteners with corrosion-resistant plated finish, as recommended by steel truss manufacturer and marked for easy identification.



1. Welding: Comply with applicable provisions of AWS D1.1/D1.1M and AWS D1.3/D1.3M.
- C. Bracing, Bridging, and Blocking Members: Fabricate required shapes from commercial quality galvanized steel sheet complying with ASTM A653/A653M, with minimum yield strength of 33,000 psi; minimum G60/Z180 coating; gauges as required for load conditions.

### **2.03 FABRICATION**

- A. Factory fabricate cold-formed steel trusses plumb, square, true to line, and with secure connections, complying with manufacturer's recommendations and project requirements.
  1. Fabricate trusses using jig templates.
  2. Cut truss members by sawing, shearing, or plasma cutting.
  3. Fasten members in full compliance with instructions of manufacturer. Wire tying of framing members is not permitted.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine structure, substrates, and installation conditions. Notify Architect of unsatisfactory preparation. Do not begin installation until substrates have been properly prepared and unsatisfactory conditions have been corrected.
- B. Proceeding with installation indicates installer's acceptance of substrate conditions.

### **3.02 INSTALLATION**

- A. Install cold-formed steel trusses in strict accordance with manufacturer's instructions and approved shop drawings, using approved fastening methods.
- B. Install temporary erection bracing and permanent bracing and bridging before application of any loads. Erect trusses with plane of truss webs vertical and parallel to each other, accurately located at spacing indicated. Anchor trusses securely at bearing points.
- C. Adequately distribute applied loads to avoid exceeding the carrying capacity of any one joint, truss, or other component.
- D. Exercise care to avoid damaging truss members during lifting and erection and to minimize horizontal bending of trusses.
- E. Removal, cutting, or alteration of any truss chord, web, or bracing member in the field is prohibited, unless approved in advance by Architect or the engineer of record and the truss manufacturer.
- F. Repair or replace damaged members and complete trusses as directed and approved in writing by Architect or the engineer of record and the truss manufacturer.
- G. Galvanizing Repair: Touch up bare steel with zinc-rich paint in compliance with ASTM A780/A780M.
- H. Roof Trusses:
  1. Comply with recommendations of CFSEI 5000.
  2. Align truss bottom chords with load-bearing studs or continuously reinforce track as required to transfer loads to structure.
  3. Install continuous bridging and permanent truss bracing as indicated.
  4. Install roof cross bracing and diagonal bracing as indicated.

### **3.03 TOLERANCES**

- A. Install trusses to maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet.

- B. Space individual trusses not more than plus or minus 1/2 inch from plan location. Cumulative error in placement may not exceed minimum fastening requirements of sheathing or other material fastened to trusses.

**3.04 FIELD QUALITY CONTROL**

- A. Owner will provide inspection service for inspection of field connections, in accordance with requirements of Section 01 40 00 - Quality Requirements.

**3.05 PROTECTION**

- A. Protect trusses from damage by subsequent construction activities.
- B. Repair or replace damaged trusses, truss members, and bracing members; obtain approval in advance by Architect or the engineer of record and the truss manufacturer for all cutting, repairs, and replacements.

**END OF SECTION**

**SECTION 05 50 00  
METAL FABRICATIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Shop fabricated steel and aluminum items.
- B. Downspout boots.

**1.02 RELATED REQUIREMENTS**

**1.03 REFERENCE STANDARDS**

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- C. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2016).
- D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2020.
- E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- G. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014, with Editorial Revision (2017).
- H. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021.
- I. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- J. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- K. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- L. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- M. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- N. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2020.
- O. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- P. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.
- Q. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
- R. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- S. SSPC-SP 2 - Hand Tool Cleaning; 2018.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS - STEEL**

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A500/A500M Grade B cold-formed or hot rolled, ASTM A501/A501M ; seamless structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Cold-Rolled Carbon Steel Sheets: ASTM A653/A653M . Provide "Commercial" galvanizing, for exterior use.
- F. Stainless Steel, General: ASTM A666, Type 304.
- G. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.
- H. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- I. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- J. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- K. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

### **2.02 MATERIALS - ALUMINUM**

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B209 (ASTM B209M), 5052 alloy, H32 or H22 temper.
- C. Bolts, Nuts, and Washers: Stainless steel.

### **2.03 FABRICATION**

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

### **2.04 FABRICATED ITEMS**

- A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- B. Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.

- C. Lintels: As detailed; galvanized finish.

## 2.05 DOWNSPOUT BOOTS

- A. Downspout Boots: Smooth interior without boxed corners or choke points; include integral lug slots, integral cleanout, cleanout cover, and tamper proof fasteners.
1. Configuration: Angular.
  2. Material: Cast iron; ASTM A48/A48M; casting thickness 3/8 inch (9.5 mm), minimum.
  3. Finish: Manufacturer's standard factory applied powder coat finish.

## 2.06 FINISHES - STEEL

- A. Prime paint steel items.
1. Exceptions: Galvanize items to be embedded in concrete and items to be embedded in masonry.
  2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
- E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.
- F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

## 2.07 FINISHES - ALUMINUM

- A. Exterior Aluminum Surfaces: Class I color anodized.
- B. Interior Aluminum Surfaces: Class I natural anodized.
- C. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

## 2.08 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

### 3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

### 3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.

- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Perform field welding in accordance with AWS D1.1/D1.1M.
- D. Obtain approval prior to site cutting or making adjustments not scheduled.
- E. After erection, prime welds, abrasions, and surfaces not shop primed , except surfaces to be in contact with concrete.

**3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

**END OF SECTION**

**SECTION 05 51 33  
METAL LADDERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Shop-fabricated metal ladders.

**1.02 REFERENCE STANDARDS**

- A. 29 CFR 1910.28 - Duty to have Fall Protection and Falling Object Protection; Current Edition.
- B. 29 CFR 1910.29 - Fall Protection Systems and Falling Object Protection - Criteria and Practices; Current Edition.
- C. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2018.
- D. ANSI/ASSP Z359.16 - Safety Requirements for Climbing Ladder Fall Arrest Systems; 2016.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014, with Editorial Revision (2017).
- G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- H. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.
- I. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
- J. SSPC-SP 2 - Hand Tool Cleaning; 2018.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data sheets on each ladder safety system product to be used, including installation instructions.
- C. Shop Drawings:
  - 1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
- D. Certificate: Provide documentation that ladder safety system products of this section meet or exceed cited 29 CFR 1910.28, 29 CFR 1910.29, ANSI/ASSP Z359.16, and ANSI A14.3 requirements.

**PART 2 PRODUCTS**

**2.01 MATERIALS - STEEL**

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Mechanical Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
- E. Bolts, Nuts, and Washers: ASTM A307, plain.
- F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

- G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

## **2.02 FABRICATION**

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

## **2.03 FABRICATED LADDERS**

- A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.
1. Side Rails: 3/8 by 2 inches members spaced at 20 inches.
  2. Rungs: One inch diameter solid round bar spaced 12 inches on center.
  3. Space rungs 7 inches from wall surface.

## **2.04 FINISHES - STEEL**

- A. Prime paint steel items.
1. Do not prime surfaces where field welding is required.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.

## **2.05 FABRICATION TOLERANCES**

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Confirm that the ladder structure to which the ladder safety system is installed is capable of withstanding the loads applied by the system in the event of a fall.

### **3.02 PREPARATION**

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

### **3.03 INSTALLATION**

- A. Install items plumb and level, accurately fitted, free from distortion or defects.



- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Obtain approval prior to site cutting or making adjustments not scheduled.

**3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

**END OF SECTION**

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**SECTION 06 10 00  
ROUGH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Rough opening framing for doors, windows, and roof openings.
- B. Sheathing.
- C. Preservative treated wood materials.
- D. Fire retardant treated wood materials.
- E. Miscellaneous framing and sheathing.
- F. Concealed wood blocking, nailers, and supports.
- G. Miscellaneous wood nailers, furring, and grounds.

**1.02 RELATED REQUIREMENTS**

- A. Section 09 21 16 - Gypsum Board Assemblies: Gypsum-based sheathing.

**1.03 REFERENCE STANDARDS**

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- B. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2017).
- C. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing; 2019a.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.
- E. AWPA U1 - Use Category System: User Specification for Treated Wood; 2018.
- F. PS 1 - Structural Plywood; 2009.
- G. PS 2 - Performance Standard for Wood-Based Structural-Use Panels; 2010.
- H. PS 20 - American Softwood Lumber Standard; 2020.
- I. SPIB (GR) - Grading Rules; 2014.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials.
- C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

**1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

- B. Correct defective work within a two-year period commencing on Date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
  - 2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at [www.alsc.org](http://www.alsc.org), and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

### **2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
  - 1. Lumber: S4S, No. 2 or Standard Grade.
  - 2. Boards: Standard or No. 3.

### **2.03 CONSTRUCTION PANELS**

- A. Wall Sheathing: Oriented strand board wood structural panel; PS 2, with factory-applied fire-retardant treatment and fire-resistant cementitious facer.
- B. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

### **2.04 ACCESSORIES**

- A. Fasteners and Anchors:
  - 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
  - 2. Anchors: Toggle bolt type for anchorage to hollow masonry.
- B. Subfloor Adhesives: Waterproof, air cure type, cartridge dispensed; adhesives designed for subfloor applications and complying with either ASTM C557 or ASTM D3498.

### **2.05 FACTORY WOOD TREATMENT**

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
  - 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
  - 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.
- B. Fire Retardant Treatment:
  - 1. Interior Type A: AWWA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated;

capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.

- a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
  - b. Treat rough carpentry items as indicated .
  - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Treatment:
1. Preservative Pressure Treatment of Lumber Above Grade: AWWA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
    - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
    - b. Treat lumber exposed to weather.
    - c. Treat lumber in contact with roofing, flashing, or waterproofing.
    - d. Treat lumber in contact with masonry or concrete.
    - e. Treat lumber less than 18 inches above grade.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Coordinate installation of rough carpentry members specified in other sections.

#### **3.02 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

#### **3.03 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
- C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- F. Provide the following specific nonstructural framing and blocking:
  1. Cabinets and shelf supports.
  2. Wall brackets.
  3. Handrails.
  4. Grab bars.
  5. Towel and bath accessories.

6. Wall-mounted door stops.
7. Chalkboards and marker boards.
8. Wall paneling and trim.
9. Joints of rigid wall coverings that occur between studs.

### **3.04 INSTALLATION OF CONSTRUCTION PANELS**

- A. Subflooring/Underlayment Combination: Glue and nail to framing; staples are not permitted.
- B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
  1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
  2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
  3. Install adjacent boards without gaps.

### **3.05 TOLERANCES**

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

### **3.06 CLEANING**

- A. Waste Disposal: See Section 01 74 19 - Construction Waste Management and Disposal.
  1. Comply with applicable regulations.
  2. Do not burn scrap on project site.
  3. Do not burn scraps that have been pressure treated.
  4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION**

**SECTION 06 41 00**  
**ARCHITECTURAL WOOD CASEWORK**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Specially fabricated cabinet units.
- B. Hardware.
- C. Preparation for installing utilities.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- C. Section 12 36 00 - Countertops.

**1.03 REFERENCE STANDARDS**

- A. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2017, with Errata (2019).
- B. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
- C. Product Data: Provide data for hardware accessories.
- D. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.
- E. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.
- F. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

**1.06 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
  - 1. Company with at least one project in the past 5 years with value of woodwork within 20 percent of cost of woodwork for this Project.
  - 2. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- B. Quality Certification:
  - 1. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.

2. Provide designated labels on shop drawings as required by certification program.
3. Provide designated labels on installed products as required by certification program.
4. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.
5. Replace, repair, or rework all work for which certification is refused.

#### **1.07 MOCK-UP**

- A. Provide mock-up of typical base cabinet, wall cabinet, and countertop, including hardware, finishes, and plumbing accessories.
- B. See Section 01 40 00 - Quality Requirements for additional requirements.
- C. Locate where directed.
- D. Mock-up may remain as part of the Work.

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Protect units from moisture damage.

#### **1.09 FIELD CONDITIONS**

- A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

### **PART 2 PRODUCTS**

#### **2.01 CABINETS**

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Plastic Laminate Faced Cabinets: Custom grade.
- C. Cabinets:
  1. Layout for Cabinet and Door Fronts: Flush panel.
    - a. Custom Grade: Doors, drawer fronts and false fronts wood grain to run and match vertically within each cabinet unit.
  2. Cabinet Style: Flush overlay.
  3. Cabinet Doors and Drawer Fronts: Flush style.
  4. Drawer Construction Technique: As recommended by fabricator.

#### **2.02 WOOD-BASED COMPONENTS**

- A. Wood fabricated from old growth timber is not permitted.

#### **2.03 LAMINATE MATERIALS**

- A. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.
- B. Provide specific types as indicated.
  1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through color, finish as indicated.
  2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through color, finish as indicated.
  3. Cabinet Liner: CLS, 0.020 inch nominal thickness, through color, finish as indicated.
  4. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.
  5. Melamine (MCP): Thermally fused melamine laminate, NEMA Test LD 3-1995.
    - a. Use in locations not exposed to view, as indicated on Drawings.



- b. Color: White.

## 2.04 COUNTERTOPS

- A. Countertops are specified in Section 12 36 00.

## 2.05 ACCESSORIES

- A. Adhesive: Type recommended by AWI/AWMAC to suit application.
- B. Plastic Edge Banding: 3MM Extruded PVC, flat shaped; smooth finish; self locking serrated tongue; of width to match component thickness.
1. Color: As selected by Architect from manufacturer's standard range.
- C. Fasteners: Size and type to suit application.
- D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.
- E. Concealed Joint Fasteners: Threaded steel.

## 2.06 HARDWARE

- A. Hardware shall comply with ADA Accessibility Guidelines, 28 CFR Part 36, Appendix A. Hardware and operating mechanisms shall have a shape that is easy to grasp and shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to operate the hardware, doors or drawers shall be no greater than 5 pounds force.
- B. Hardware: BHMA A156.9, types as indicated for quality grade specified.
- C. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards and coordinated self rests, polished chrome or satin chrome finish, for nominal 1 inch spacing adjustments.
- D. Drawer and Door Pulls: "U" shaped wire pull, steel with satin finish, 4 inch centers.
- E. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with satin finish.
- F. Catches: Magnetic.
- G. Drawer Slides:
1. Type: Full extension.
2. Static Load Capacity: Commercial grade.
3. Mounting: Side mounted.
4. Stops: Integral type.
5. Features: Provide self closing/stay closed type.
6. Manufacturers:
- a. Accuride International, Inc: [www accuride.com/#sle](http://www accuride.com/#sle).
- b. Blum, Inc: [www blum.com/#sle](http://www blum.com/#sle).
- c. Grass America Inc: [www grassusa.com/#sle](http://www grassusa.com/#sle).
- d. Knappe & Vogt Manufacturing Company: [www knapeandvogt.com/#sle](http://www knapeandvogt.com/#sle).
- e. Substitutions: See Section 01 60 00 - Product Requirements.
- H. Hinges: European style concealed self-closing type, steel with satin finish.
1. Manufacturers:
- a. Blum, Inc: [www blum.com/#sle](http://www blum.com/#sle).
- b. Grass America Inc: [www grassusa.com/#sle](http://www grassusa.com/#sle).
- c. Hardware Resources: [www hardwareresources.com/#sle](http://www hardwareresources.com/#sle).

- d. Hettich America, LP: [www.hettich.com/#sle](http://www.hettich.com/#sle).
- e. Substitutions: See Section 01 60 00 - Product Requirements.

## **2.07 FABRICATION**

- A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
  - 1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
  - 2. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- E. Mechanically fasten back splash to countertops as recommended by laminate manufacturer at 16 inches on center.
- F. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

### **3.02 INSTALLATION**

- A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- B. Use fixture attachments in concealed locations for wall mounted components.
- C. Use concealed joint fasteners to align and secure adjoining cabinet units.
- D. Secure cabinets to floor using appropriate angles and anchorages.
- E. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

### **3.03 ADJUSTING**

- A. Adjust installed work.
- B. Adjust moving or operating parts to function smoothly and correctly.

### **3.04 CLEANING**

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

**END OF SECTION**

**SECTION 07 13 00  
SHEET WATERPROOFING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Sheet Waterproofing:
  - 1. Self-adhered HDPE sheet membrane.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete substrate.
- B. Section 07 21 00 - Thermal Insulation: Insulation used for protective cover.

**1.03 REFERENCE STANDARDS**

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).
- B. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds; 1998 (Reapproved 2017).
- C. ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test); 2008, with Editorial Revision (2015).
- D. ASTM D5295/D5295M - Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems; 2018.
- E. ASTM D5385/D5385M - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes; 2020.
- F. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- G. NRCA (WM) - The NRCA Waterproofing Manual; 2021.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for membrane.
- C. Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Indicate special procedures.
- E. Manufacturer's Qualification Statement.
- F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- G. Specimen Warranty.

**1.05 QUALITY ASSURANCE**

- A. Membrane Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

**1.06 FIELD CONDITIONS**

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.

**1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

- B. Contractor shall correct defective Work within a five year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no extra cost to Owner.

## **PART 2 PRODUCTS**

### **2.01 WATERPROOFING APPLICATIONS**

- A. Self-Adhered HDPE Sheet Membrane:  
1. Location: All locations sheet waterproofing is required.

### **2.02 MEMBRANE MATERIALS**

- A. Self-Adhered HDPE Sheet Membrane: Recommended by manufacturer for placement below concrete slabs and on outside face of below grade walls before placement of concrete.
1. Sheet Thickness: 46 mil, 0.046 inch, minimum.
  2. Hydrostatic Pressure Resistance: Resists pressure of 231 ft head of water, when tested in accordance with ASTM D5385/D5385M.
  3. Elongation at Break: 500 percent, minimum, measured in accordance with ASTM D412.
  4. Tensile Strength, Film: 3,500 psi, minimum, measured in accordance with ASTM D412.
  5. Lap Peel Adhesion: 8 lb per inch, minimum, when tested in accordance with ASTM D1876.
  6. Water Vapor Permeance: 0.01 perm, maximum, measured in accordance with ASTM E96/E96M.
  7. Bond to Concrete: 5 lb per inch, minimum, measured in accordance with ASTM D903.
  8. Lateral Water Migration Resistance: Resists pressure of 231 ft head of water, when tested in accordance with ASTM D5385/D5385M.
  9. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.

### **2.03 ACCESSORIES**

- A. Seaming Materials: As recommended by membrane manufacturer.
- B. Membrane Sealant: As recommended by membrane manufacturer..
- C. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials.
- D. Protection Board: Rigid insulation as specified in Section 07 21 00.
- E. Flexible Flashings: Type recommended by membrane manufacturer.
- F. Termination Bars: Aluminum; compatible with membrane and adhesives.
- G. Adhesives: As recommended by membrane manufacturer.
- H. Thinner and Cleaner: As recommended by adhesive manufacturer, compatible with sheet membrane.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions are acceptable prior to starting this work.
- B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.
- C. Verify items that penetrate surfaces to receive waterproofing are securely installed.

### **3.02 PREPARATION**

- A. Protect adjacent surfaces from damage not designated to receive waterproofing.

- B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions; vacuum substrate clean.
- C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.
- D. Fill non-moving joints and cracks with a filler compatible with waterproofing materials.
- E. Seal moving cracks with sealant and non-rigid filler, using procedures recommended by sealant and waterproofing manufacturers.
- F. Prepare building expansion joints at locations as indicated on drawings.
- G. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer, and protect conditioner from rain or frost until dry.
- H. Concrete Surfaces for Adhesive Bonding: Prepare concrete substrate according to ASTM D5295/D5295M.
  - 1. Remove substances that inhibit adhesion including form release agents, curing compounds admixtures, laitance, moisture, dust, dirt, grease and oil.
  - 2. Repair surface defects including honeycombs, fins, tie holes, bug holes, sharp offsets, ruttled cracks, ragged corners, deviations in surface plane, spalling and delaminations, as described in the reference standard.
  - 3. Remove and replace areas of defective concrete as specified in Section 03 30 00.
  - 4. Prepare concrete for adhesive bonded waterproofing using mechanical or chemical methods described in the referenced standard.
  - 5. Test concrete surfaces as described in the referenced standards. Verify surfaces are ready to receive adhesive bonded waterproofing membrane system.

### **3.03 INSTALLATION - MEMBRANE**

- A. Install membrane waterproofing in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
- B. Roll out membrane, and minimize wrinkles and bubbles.
- C. Overlap edges and ends, minimum 3 inches, seal permanently waterproof by method recommended by manufacturer, and apply uniform bead of sealant to joint edge.
- D. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.
- E. Weather lap joints on sloped substrate in direction of drainage, and seal joints and seams.
- F. Flexible Flashings: Seal items watertight that penetrate through waterproofing membrane with flexible flashings.
- G. Seal membrane and flashings to adjoining surfaces.

### **3.04 FIELD QUALITY CONTROL**

- A. Upon completion of horizontal membrane installation, dam installation area in preparation for flood testing.
  - 1. Flood to minimum depth of 1 inch with clean water, and after 48 hours inspect for leaks.
  - 2. If leaking is found, remove water, repair leaking areas with new waterproofing materials as directed by Architect; repeat flood test, and repair damage to building.
  - 3. When area is proven watertight, drain water and remove dam.

### **3.05 PROTECTION**

- A. Do not permit traffic over unprotected or uncovered membrane.

**END OF SECTION**

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**SECTION 07 19 00  
WATER REPELLENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Water repellents applied to exterior, masonry, stone, and concrete surfaces.
- B. Pressure washing.

**1.02 REFERENCE STANDARDS**

- A. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units; 2020a.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description.
- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention; cautionary procedures required during application.

**1.04 FIELD CONDITIONS**

- A. Protect liquid materials from freezing.
- B. Do not apply water repellent when ambient temperature is lower than 50 degrees F or higher than 100 degrees F.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Silane, Siloxane, Silane-Siloxane Blend, and Siliconate Water Repellents:
  - 1. BASF Construction Chemicals: [www.buildingsystems.basf.com/#sle](http://www.buildingsystems.basf.com/#sle).
  - 2. PROSOCO, Inc: [www.prosoco.com/#sle](http://www.prosoco.com/#sle).
  - 3. Tnemec Company, Inc: [www.tnemec.com/#sle](http://www.tnemec.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 MATERIALS**

- A. Water Repellent: Non-glossy, colorless, penetrating, water-vapor-permeable, non-yellowing sealer, that dries invisibly leaving appearance of substrate unchanged.
  - 1. Applications: Vertical surfaces and non-traffic horizontal surfaces.
  - 2. Number of Coats: Two.
  - 3. Moisture Absorption When Applied to Masonry: Five percent, maximum, when tested in accordance with ASTM C140/C140M using masonry sample completely coated with water repellent.
  - 4. Maintains dry appearance when wetted.
  - 5. Silane, siloxane, silane-siloxane blend, or siliconate that reacts chemically with concrete and masonry.
    - a. Manufacturers:
      - 1) BASF Construction Chemicals; Enviroseal 20:  
[www.buildingsystems.basf.com/#sle](http://www.buildingsystems.basf.com/#sle).
      - 2) PROSOCO, Inc; Consolideck SL100 Water Repellent, with VOC of 400 g/L or less: [www.prosoco.com/#sle](http://www.prosoco.com/#sle).
      - 3) Tnemec Inc; Prime-A-Pell Plus V662, with VOC of 400 g/L or less:  
[www.tnemec.com/#sle](http://www.tnemec.com/#sle).

- 4) Substitutions: See Section 01 60 00 - Product Requirements.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify joint sealants are installed and cured.
- C. Verify surfaces to be coated are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of water repellent.

#### **3.02 PREPARATION**

- A. Protection of Adjacent Work:
  - 1. Protect adjacent landscaping, property, and vehicles from drips and overspray.
  - 2. Protect adjacent surfaces not intended to receive water repellent.
- B. Prepare surfaces to be coated as recommended by water repellent manufacturer for best results.
- C. Do not start work until masonry mortar substrate is cured a minimum of 60 days.
- D. Remove loose particles and foreign matter.
- E. Remove oil and foreign substances with a chemical solvent that will not affect water repellent.
- F. Pressure wash surfaces to be coated.
- G. Allow surfaces to dry completely to degree recommended by water repellent manufacturer before starting coating work.

#### **3.03 APPLICATION**

- A. Apply water repellent in accordance with manufacturer's instructions, using procedures and application methods recommended as producing the best results.
- B. Apply at rate recommended by manufacturer, continuously over entire surface.
- C. Apply two coats, minimum.
- D. Remove water repellent from unintended surfaces immediately by a method instructed by water repellent manufacturer.

**END OF SECTION**



**SECTION 07 21 00  
THERMAL INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Board insulation at perimeter foundation wall.
- B. Batt insulation in exterior wall and ceiling construction.
- C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

**1.02 REFERENCE STANDARDS**

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2019.
- B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.
- D. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C; 2019a.
- E. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2019.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

**1.04 FIELD CONDITIONS**

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

**PART 2 PRODUCTS**

**2.01 APPLICATIONS**

- A. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.

**2.02 FOAM BOARD INSULATION MATERIALS**

- A. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
  - 1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
  - 2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  - 3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  - 4. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88) per 1 inch thickness at 75 degrees F mean temperature.
  - 5. Complies with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
  - 6. Board Edges: Square.

7. Type and Water Absorption: Type IV, 0.3 percent by volume, maximum, by total immersion.
8. Products:
  - a. Dow Chemical Company; STYROFOAM Square Edge:  
[www.dowbuildingsolutions.com/#sle](http://www.dowbuildingsolutions.com/#sle).
  - b. Kingspan Insulation LLC; GreenGuard XPS Type IV, 25 psi:  
[www.kingspan.com/#sle](http://www.kingspan.com/#sle).
  - c. Owens Corning Corporation; FOAMULAR Extruded Polystyrene (XPS) Insulation:  
[www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).
  - d. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.03 BATT INSULATION MATERIALS**

- A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
  1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
  2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
  3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
  4. Formaldehyde Content: Zero.
  5. Products:
    - a. CertainTeed Corporation; CertaPRO Universal Blanket Unfaced:  
[www.certainteed.com/#sle](http://www.certainteed.com/#sle).
    - b. Owens Corning Corporation; EcoTouch PINK FIBERGLAS Insulation:  
[www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.04 ACCESSORIES**

- A. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch wide.
- B. Tape joints of rigid insulation in accordance with roofing and insulation manufacturers' instructions.
- C. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.
- D. Adhesive: Type recommended by insulation manufacturer for application.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

### **3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER**

- A. Adhere a 6 inches wide strip of polyethylene sheet over construction, control, and expansion joints with double beads of adhesive each side of joint.
  1. Tape seal joints.
- B. Apply adhesive to back of boards:
  1. Three continuous beads per board length.
- C. Install boards horizontally on foundation perimeter.
  1. Place boards to maximize adhesive contact.

- 2. Install in running bond pattern.
- 3. Butt edges and ends tightly to adjacent boards and to protrusions.
- D. Extend boards over expansion joints, unbonded to foundation on one side of joint.
- E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

**3.03 BATT INSTALLATION**

- A. Install insulation in accordance with manufacturer's instructions.
- B. Install in exterior wall spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. Staple or nail facing flanges in place at maximum 6 inches on center.

**3.04 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements for additional requirements.

**3.05 PROTECTION**

- A. Do not permit installed insulation to be damaged prior to its concealment.

**END OF SECTION**

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**SECTION 07 21 10**  
**POLYISOCYANURATE CONTINUOUS WALL INSULATION**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. Thermax Wall System; foil faced polyisocyanurate (ISO) board insulation.
  - 1. Sheathing system; Thermax (ci) Exterior Insulation.

**1.02 RELATED REQUIREMENTS**

- A. Section 04 20 00 - Unit Masonry: Cavity wall veneers.
- B. Section 09 21 16 - Gypsum Board Assemblies: Gypsum wall sheathing substrate in cavity.

**1.03 REFERENCE STANDARDS**

- A. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2018.
- B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2019.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.
- D. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).
- E. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies; 2018.
- F. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2019.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-installation Meeting: Prior to commencement of application of wall system, review and document methods and installation procedures, including the following:
  - 1. Review metal wall framing assemblies for potential interference and conflicts, and coordinate layout and support provisions for interfacing work.
  - 2. Review wall sheathing, flashing, application procedures, and manufacturer's installation instructions.
  - 3. Review construction schedule and confirm availability of products, installation personnel, equipment and facilities.
  - 4. Review governing regulatory requirements, and requirements for applicable insurance and certificates.
  - 5. Review field quality control requirements.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations for each type of product indicated.
- C. Test Reports: Submit evaluation reports published by independent laboratory indicating evidence of compliance with specified criteria.

1. Fire Resistance: Submit documentation showing wall assembly components are in compliance with NFPA 285.
- D. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing wall insulation system work of the type specified and with at least three years of documented experience.

#### **1.07 PERFORMANCE REQUIREMENTS**

- A. Air Barrier: Tested in accordance with ASTM E2357 at pressure of 6.24 psf or greater, with air infiltration less than 0.04 cfm/sq ft of fixed wall area.
  1. Conduct testing at positive and negative sustained wind loading of 12.5 psf for one-hour duration in each direction.
  2. Provide pressure cycling of wall at 2,000 cycles in both positive and negative directions, ending with wind gust loading at 25 psf.
- B. Water Penetration: Tested in accordance with ASTM E331, with minimum pressure differential of 6.24 psf for at least two hour test duration without any uncontrolled water penetration.
- C. Mold Resistance: Provide system components that are non-food source for fungal growth.
- D. Fire Propagation: System passes NFPA 285 testing as part of an approved assembly.
- E. Coordinate installation of insulation system with cavity wall veneers, refer to Section 04 2000 for additional information.

#### **1.08 MOCK-UP**

- A. Provide mock-up of specified system, at least 12 feet long by 10 feet wide, illustrating proper installation of specified wall assembly in compliance with manufacturer's recommendations.
- B. See Section 01 40 00 - Quality Requirements, for additional requirements.
- C. Locate as directed by Architect.
- D. Mock-up may remain as part of this work.

#### **1.09 DELIVERY, STORAGE, AND HANDLING**

- A. Protect thermal insulation materials from physical damage and from deterioration due to moisture, soiling and other sources; store in dry interior location.
- B. Comply with manufacturer's recommendations for delivery, storage, and handling.

#### **1.10 FIELD CONDITIONS**

- A. Installation Temperatures: Comply with manufacturer's recommendations for temperatures during product installation.
- B. Environmental Requirements: Install this work in compliance with manufacturer's environmental requirements, and during conditions in accordance with manufacturer's recommended minimum surface temperatures.

### 1.11 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Thermax Wall System; Foam on Batt: Provide system warranty; six (6) month exposure, 15 year thermal, and 10 year water resistance.

## PART 2 - PRODUCTS

### 2.01 PERFORMANCE REQUIREMENTS

- A. Air Barrier: Tested in accordance with ASTM E2357 at pressure of 6.24 psf or greater, with air infiltration less than 0.04 cfm/sq ft of fixed wall area.
  - 1. Conduct testing at positive and negative sustained wind loading of 12.5 psf for one-hour duration in each direction.
  - 2. Provide pressure cycling of wall at 2,000 cycles in both positive and negative directions, ending with wind gust loading at 25 psf.
- B. Water Penetration: Tested in accordance with ASTM E331, with minimum pressure differential of 6.24 psf for at least two hour test duration without any uncontrolled water penetration.
- C. Mold Resistance: Provide system components that are non-food source for fungal growth.
- D. Fire Propagation: System passes NFPA 285 testing as part of an approved assembly.
- E. Coordinate installation of insulation system with cavity wall veneers, refer to Section 04 20 01 MASONRY VENEER for additional information.

### 2.02 RIGID CONTINUOUS WALL INSULATION SYSTEM

- A. Basis of Design Products: Specific brand names used in drawings and specifications are used to establish design and quality standards, performance criteria, technical characteristics, or other salient requirements. It is not intended to restrict products that are equal to these characteristics. Products that clearly and demonstrably meet the requirements may also be acceptable
- B. Provide continuous insulation system that controls thermal, air, vapor, and water penetration, and provides continuity of building envelope enclosure, at locations indicated.
  - 1. Provide insulated sheathing on exterior of metal wall framing assembly at locations indicated.
  - 2. Provide joint, penetration and gap sealing material for sealing component joints, penetrations through wall system and gaps between building envelope enclosure components and wall opening frames.
  - 3. Provide batt insulation in stud cavity. See Section 07 21 00 Thermal Insulation.
  - 4. Provide spray polyurethane foam (SPF) insulation in stud cavity.
- C. Polyisocyanurate (ISO) Board Insulation with Foil Facers on Both Sides: Complies with ASTM C1289, Type I with 4 mil, 0.004 inch thick embossed gray thermoset-coated aluminum foil on exterior side and 1.25 mil, 0.0009 inch thick embossed reflective aluminum on interior side; Class 2 glass fiber reinforced core foam.
  - 1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  - 2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  - 3. Compressive Resistance: At least 25 psi.
  - 4. Water Vapor Permeance: Maximum of 0.04 perms per 1 inch thickness.
  - 5. Water Absorption: Maximum of 0.1 percent by volume by total immersion.
  - 6. Board Overall Dimensions: 48 inch wide by 96 inch long.

7. Board Thickness: Nominal thickness as indicated.
  - a. Edge Treatment: Square edge at long side.
8. Thermal Resistance (R-value): At least 4.1 for board thickness indicated at 75 degrees F
9. Manufacturer:
  - a. Basis of Design: DuPont de Nemours, Inc; Thermax XARMOR (ci): [building.dupont.com/#sle](http://building.dupont.com/#sle), or equal.

### 2.03 ACCESSORIES

- A. Stud Cavity Batt Insulation: Provide batt insulation in accordance with Section 07 21 00 Thermal Insulation, in areas indicated on drawings.
- B. Gypsum Sheathing: Provide moisture and mold-resistant glass mat gypsum wall board in accordance with Section 09 21 16, in areas indicated on drawings.
- C. Counter Flashing Adhesive: Butyl rubber type for straight opening, and wider thru-wall flashing openings.
- D. Board Insulation Bonding Adhesive: Provide product as recommended by insulation manufacturer that will not damage insulation or substrates.
- E. Facer Repair Flashing: Provide board insulation manufacturer's recommended flashing for repair of damaged board insulation facer.
  1. Products: LiquidArmor CM Spray Flashing and Sealant, LiquidArmor LT Flexible Single Component Silicone Flashing, or LiquidArmor QS Spray Flashing and Sealant as manufactured by DuPont de Nemours, Inc.
- F. Flashing and Sealant: Provide for sealing joints, seams and veneer tie penetrations through board insulation.
  1. Spray applied elastomeric liquid flashing and sealant, grey-blue color.
    - a. Product: LiquidArmor CM as manufactured by DuPont de Nemours, Inc.
  2. Trowel applied single component silicone flashing and sealant, grey color.
    - a. Product: LiquidArmor LT as manufactured by DuPont de Nemours, Inc.
- G. Board Insulation Anchors: Board insulation manufacturer's recommended polymer or other corrosion protected steel screw with EPDM washer for thermally broken anchorage of exterior veneer to concrete masonry unit (CMU) substrate through board insulation; ASTM C954.
  1. Provide anchor length and size as required for board insulation and wall sheathing thickness.
  2. Locate fastener from edge of board insulation a maximum of 8 inch and in compliance with fastening pattern.
  3. Pre-drill substrate prior to installation of wall anchor, sleeve and thermal-clip.
  4. Product: Pos-i-tie ThermalClip and barrel screw for concrete/CMU backup wall application by Heckmann Building Products, Inc.
- H. Fasteners: Board insulation manufacturer's recommended polymer or other corrosion protected steel screw with washer for fastening insulation sheathing to CMU substrate; ASTM C954.
  1. Provide fastener length and size as required for board insulation sheathing thickness.
  2. Provide fastener along placement of base flashing as necessary.
  3. Product: Grip-Deck Self-Drilling Ceramic Coated Screws by Rodenhouse, Inc.
- I. Washer: Provide 2 inch diameter plastic washers for each screw fastener.



- J. Sill Plate Seal: Provide flexible polyethylene foam gasketing strip between top of foundation and sill plate.
1. Product: Sill Seal Foam Gasket as manufactured by DuPont de Nemours, Inc.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine substrates and installation conditions for compliance with manufacturer's recommended installation requirements.
- B. Verify that masonry joints are struck flush and other conditions are acceptable for proper installation.
- C. Remove concrete fins and mortar projections that interfere with placement of board insulation.
- D. Verify that substrate walls, and opening framing, bridging, bracing and other framing support and anchorage members have been installed within thermal wall system alignment tolerances and other requirements.
- E. Verify that items required to penetrate thermal wall system are in-place and penetration gaps and cracks are properly sealed.
- F. Do not proceed with thermal wall system installation until unsatisfactory conditions have been corrected.
- G. Commencing installation constitutes acceptance of existing conditions and responsibility of specified performance.

#### **3.02 INSTALLATION, THERMAX CONTINUOUS WALL INSULATION SYSTEM**

- A. Comply with foil faced polyisocyanurate (ISO) board insulation and spray polyurethane foam (SPF) manufacturer's installation instructions for applications indicated.
- B. Foil Faced Polyisocyanurate (ISO) Board Insulation:
  1. Fasten board insulation to exterior face of metal stud wall framing (or gypsum sheathing) using insulation sheathing and manufacturer's recommended screw fastener type and length with washers.
  2. Install board insulation panels tightly to each other and around openings and penetrations.
  3. Install insulation sheathing panels horizontally with embossed aluminum foil facer to exterior side.
    - a. Use panels having maximum length to minimize number of joints.
    - b. Locate vertical edge joints parallel to and centered over support framing.
    - c. Provide additional support framing wherever panel edge joints do not bear against metal stud framing or sill plate.
  4. Fasten panels to support framing with fasteners spaced at maximum of 12 inch on center at wall perimeter, and at maximum of 16 inch on center at panel field.
    - a. Set perimeter fasteners back from edge of insulation panels at least 3/8 inch.
    - b. Drive fasteners to bear tight and flush with surface of insulation panel.
    - c. Maximum of two board joints may be bridged per fastener.
  5. Install flashing along perimeter edge joints of insulation panels.
  6. Install flashing at wall tie penetrations and other mechanical fastening assemblies of insulation panels.
  7. Install facer repair flashing along top edge of base flashing applied to insulation panel, that may also include termination bar, running horizontally along top edge of flashing and

lapped over top edge of base.

- a. Provide flat strap in framing at termination bar height to allow for proper fastening of termination bar.

### 3.03 INSTALLATION, THERMAX - INSULATION SYSTEM

- A. Comply with foil faced polyisocyanurate (ISO) board insulation manufacturer's installation instructions for applications indicated.
  1. Do not install polyisocyanurate (ISO) board insulation that has become soiled, wet, or has not been properly protected from exposure to sunlight.
  2. Dry fit polyisocyanurate (ISO) board insulation prior to final installation; neatly trim board around conduits, pipes, and other items that will penetrate board insulation.

### 3.04 INSTALLATION, GENERAL

- A. Gypsum Sheathing: Install in accordance with Section 09 21 16.
- B. Spray Applied Flashing and Sealant:
  1. Dry Film Thickness (DFT): At least 30 mil, 0.030 inch fully cured.
  2. Ensure that surface and ambient temperatures are 35 degrees F and rising and below 120 degrees F during application.
  3. Do not apply product on surfaces with standing water or frost.
  4. Avoid installing on days with a high probability of significant rainfall.
  5. Seal gaps greater than 1/4 inch in width with penetration filler prior to applying spray applied flashing and sealant.
    - a. If facer on board insulation is damaged, make note of affected area and apply additional spray over damaged area.
    - b. Replace damaged insulation, or repair facer flaws with appropriate flashing as recommended by insulation panel manufacturer.
  6. Apply spray applied flashing and sealant to board joints, penetrations and other fenestration openings as required with a minimum 50 mils, 0.050 inch, plus or minus 5 mils, 0.005 inch wet film thickness; apply spray using one or two passes depending on site conditions.
    - a. Apply spray 3 inch, plus or minus 1 inch wide over board insulation joints, with at least 1 inch of spray covers each side of joint.
    - b. Apply spray over fasteners and washers along board insulation joints.
    - c. Install brick anchors after spray flashing has been applied.
  7. Rough Openings: Apply spray applied flashing and sealant at least 3 inch onto face of insulation panel sheathing, and completely cover edge of insulation board; also spray at least 3 inch back onto rough opening substrate.
    - a. It is recommended to cover back onto rough opening at least the distance that is covered by traditional flashing materials.
  8. Board Insulation or Substrate Penetrations: Apply spray applied flashing and sealant at least 2 inch onto face of insulation sheathing and at least 2 inch onto penetration or primary flashing substrate.
  9. Use wet mil thickness gauge to ensure proper installation thickness.
    - a. Use paint brush to even out application thickness.
    - b. Where consistently below minimum thickness, spray-on another layer to achieve proper thickness requirements.
  10. Cures to dry to touch within one to four hours after application; depending on humidity, temperature, sun exposure and wind direction this time may be longer.

- C. Trowel Applied Flashing and Sealant
1. Ensure that surface and ambient temperatures are minus 20 degrees F and rising and below 120 degrees F during application.
  2. Do not apply product on surfaces with standing water or frost.
  3. Avoid installing on days with a high probability of significant rainfall.
  4. Seal gaps greater than 1/4 inch in width with penetration filler prior to applying trowel applied flashing and sealant.
    - a. If facer on board insulation is damaged, make note of affected area and trowel on additional sealant over damaged area.
    - b. Replace damaged insulation, or repair facer flaws with appropriate flashing as recommended by insulation panel manufacturer.
  5. Trowel board insulation joints, penetrations and other openings as required with at least 30 mil, 0.030 inch, plus or minus 5 mils, 0.005 inch wet mil thickness.
    - a. Trowel sealant at least 1 inch wide over board insulation joints, with at least 1/2 inch of sealant coverage on each side of joint.
    - b. Trowel sealant over fasteners and washers along board insulation joints.
    - c. Install brick anchors after trowel sealant has been applied.
  6. Rough Openings: Trowel flashing and sealant at least 3 inch onto face of insulation panel sheathing, and completely cover edge of insulation board; also trowel at least 3 inch back onto rough opening substrate.
    - a. It is recommended to cover back onto rough opening at least the distance that is covered by traditional flashing materials.
  7. Board Insulation or Substrate Penetrations: Trowel flashing and sealant at least 2 inch onto face of insulation sheathing and at least 2 inch onto penetration or primary flashing substrate.
  8. Use wet mil thickness gauge to ensure proper installation thickness.
  9. Visually inspect for any areas missed and trowel on sealant as necessary.
  10. Trowel on sealant is dry to the touch and skins over within 30 to 45 minutes after application.

### 3.05 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Submit polyisocyanurate (ISO) and extruded polystyrene (XPS) insulation board and spray polyurethane foam (SPF) field inspection and test reports for the following:
  1. Contractor is responsible for maintaining daily work record of required testing and inspections.
  2. Upon Owner's request, provide site inspections by qualified third party inspector.
    - a. Upon defects being revealed from site inspections, the Contractor shall immediately rectify these defects at their cost.
  3. Installer's daily work record shall verify conformance with manufacturer's installation instructions, and specified requirements.

### 3.06 PROTECTION

- A. Protect board insulation from excess moisture, mechanical damage, and exposure to open flame.
- B. Repair damage caused to board insulation in a manner that retains integrity and continuity of insulation and facer materials.

- C. Keep board insulation dry and above water on jobsite, and cover with tarp until ready for installation.
- D. Promptly cover board insulation with cladding; within maximum of 180 days after installation.

**3.07 CLEANING**

- A. Remove and dispose of excess insulation, wrappings and other waste materials.

**END OF SECTION**

**SECTION 07 42 13  
METAL WALL AND SOFFIT PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Manufactured metal panels for exterior wall panels and soffit panels, with related flashings and accessory components.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Water-resistive barrier under wall panels.
- B. Section 07 21 00 - Thermal Insulation.

**1.03 REFERENCE STANDARDS**

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- C. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2019.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:
  - 1. Physical characteristics of components shown on shop drawings.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation instructions and recommendations.
- C. Shop Drawings: Indicate dimensions, layout, joints, construction details, support clips, and methods of anchorage.
- D. Samples: Submit two samples of wall panel and soffit panel, 12 inches by 12 inches in size illustrating finish color, sheen, and texture.
- E. Test Reports: Submit test report verifying compliance with NFPA 285 for previously-tested exterior wall assembly.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.
- H. Warranty Documentation for Installation of Building Rainscreen Assembly: Submit installer warranty and ensure that forms have been completed in Owner's name and registered with installer.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in installing products of the type specified in this section with minimum three years of documented experience.

- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- B. Store prefinished material off the ground and protected from weather; prevent twisting, bending, or abrasion; provide ventilation; slope metal sheets to ensure proper drainage.
- C. Prevent contact with materials that may cause discoloration or staining of products.

#### **1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a twenty year period after Date of Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Basis of Design Products: Specific brand names used in drawings and specifications are used to establish design and quality standards, performance criteria, technical characteristics, or other salient requirements. It is not intended to restrict products that are equal to these characteristics. Products that clearly and demonstrably meet the requirements may also be acceptable.
- B. Metal Wall Panels:
  - 1. Basis of Design: Metal Wall Panels - Concealed Fasteners: Masterline-16 manufactured by MBCI.
- C. Metal Soffit Panels:
  - 1. Basis of Design: Artisan L-12 Soffit Panel by MBCI
    - a. All soffit except high roof above main entry lobby.
- D. Substitutions: See Section 01 60 00 - Product Requirements.

#### **2.02 MANUFACTURED METAL PANELS**

- A. Wall Panel System: Factory fabricated prefinished metal panel system, site assembled.
  - 1. Provide exterior wall panels and soffit panels.
  - 2. Design and size components to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of wall.
  - 3. Design Pressure: In accordance with applicable codes.
  - 4. Fire Performance: Tested in accordance with, and complying with acceptance criteria of NFPA 285.
  - 5. Maximum Allowable Deflection of Panel:  $L/180$  for length(L) of span.
  - 6. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
  - 7. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
  - 8. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.
  - 9. Corners: Factory-fabricated in one continuous piece with minimum 2 inch returns.

10. Profile: Horizontal; style as indicated.
  11. Side Seams: Double-interlocked, tight-fitting, sealed with continuous gaskets.
  12. Material: Precoated steel sheet, 24 gauge, 0.239 inch minimum thickness.
  13. Panel Width: 16 inches.
  14. Color: As selected by Architect from manufacturer's standard line.
- B. Soffit Panels:
1. Profile: Style as indicated, with venting not provided.
  2. Material: Prefinished steel 24 ga. minimum thickness.
  3. Coverage Width - 12 inches.
  4. Panel Attachment - Concealed Fastening System
  5. Finishes - Smooth.
  6. Coatings - Galvalume Plus®,
  7. Color: As selected by Architect from manufacturer's standard line.
- C. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; shop cut and factory mitered to required angles.
- D. Expansion Joints: Same material, thickness and finish as exterior sheets; 24 gauge, 0.239 inch thick; manufacturer's standard brake formed type, of profile to suit system.
- E. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.
- F. Anchors: Galvanized steel.

### 2.03 MATERIALS

- A. Precoated Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, Structural Steel (SS) or Forming Steel (FS), with G90/Z275 coating; continuous coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.

### 2.04 FINISHES

- A. Fluoropolymer Coil Coating System: Manufacturer's standard multi-coat aluminum coil coating system complying with AAMA 2605, including at least 70 percent polyvinylidene fluoride (PVDF) resin, and at least 80 percent of coil coated aluminum surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch; color and gloss to match sample.

### 2.05 ACCESSORIES

- A. Fasteners: Manufacturer's standard type to suit application; with soft neoprene washers, steel, hot dip galvanized. Fastener cap same color as exterior panel.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that building framing members are ready to receive panels.
- B. Verify that water-resistive barrier has been installed over substrate completely and correctly.

### 3.02 PREPARATION

### 3.03 INSTALLATION

- A. Install panels on walls and soffits in accordance with manufacturer's instructions.
- B. Fasten panels to structural supports; aligned, level, and plumb.
- C. Locate joints over supports.
- D. Lap panel ends minimum 2 inches.

- E. Use concealed fasteners unless otherwise approved by Architect.

**3.04 TOLERANCES**

- A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.
- B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch.

**3.05 CLEANING**

- A. Remove site cuttings from finish surfaces.
- B. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

**END OF SECTION**



**SECTION 07 42 13.23  
METAL COMPOSITE MATERIAL WALL PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Exterior cladding consisting of formed metal composite material (MCM) sheet, secondary supports, and anchors to structure, attached to solid backup.
- B. Matching flashing and trim.

**1.02 RELATED REQUIREMENTS**

- A. Section 04 20 00 - Unit Masonry: Installation of anchors.
- B. Section 05 40 00 - Cold-Formed Metal Framing: Panel support framing.
- C. Section 07 92 00 - Joint Sealants: Sealing joints between siding and adjacent construction and fixtures.

**1.03 PRICE AND PAYMENT PROCEDURES**

- A. See Section 01 23 00 - Alternates, for product alternatives affecting this section.

**1.04 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- D. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2017.
- E. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip; 2020a.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- G. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- H. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2021a.
- I. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- J. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- K. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- L. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- M. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- N. ASTM D1781 - Standard Test Method for Climbing Drum Peel for Adhesives; 1998 (Reapproved 2012).
- O. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics; 2020.

- P. ASTM D4145 - Standard Test Method for Coating Flexibility of Prepainted Sheet; 2010 (Reapproved 2018).
- Q. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.
- R. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- S. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).
- T. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).
- U. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2019.

#### **1.05 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Meeting: Convene one week before starting work of this section to verify project requirements, coordinate with installers of other work, establish condition and completeness of building substrate, and review manufacturers' installation instructions and warranty requirements.
  - 1. Require attendance by the installer and relevant sub-contractors.
  - 2. Include MCM sheet manufacturer's representative and wall system manufacturer's representative to review storage and handling procedures.
  - 3. Review in detail truck transportation, parking, vertical transportation, schedule, personnel, installation of adjacent materials and substrate.
  - 4. Review procedures for protection of work and other construction.
  - 5. Review safety precautions.

#### **1.06 SUBMITTALS**

- A. Product Data - MCM Sheets: Manufacturer's data sheets on each product to be used, including thickness, physical characteristics, and finish, and:
  - 1. Finish manufacturer's data sheet showing physical and performance characteristics.
  - 2. Storage and handling requirements and recommendations.
  - 3. Fabrication instructions and recommendations.
  - 4. Specimen warranty for finish, as specified herein.
- B. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:
  - 1. Physical characteristics of components shown on shop drawings.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation instructions and recommendations.
  - 4. Specimen warranty for wall system, as specified herein.
- C. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, support clips, exposed fasteners, number of anchors, supports, reinforcement, trim, flashings, and accessories.
  - 1. Indicate panel numbering system.
  - 2. Differentiate between shop and field fabrication.

3. Indicate substrates and adjacent work with which the wall system must be coordinated.
  4. Include large-scale details of anchorages and connecting elements.
  5. Include large-scale details or schematic, exploded or isometric diagrams to fully explain flashing at a scale of not less than 1-1/2 inches per 12 inches.
  6. Include design engineer's stamp or seal on shop drawings for attachments and anchors.
- D. Selection Samples: For each finish product specified, submit at least three sample color chips representing manufacturer's standard range of available colors and patterns.
1. Sealant Color: Color to match wall panels.
- E. Verification Samples: For each finish product specified, submit at least three samples, minimum size 12 inch square, and representing actual product in color and texture.
- F. Certificate: Certify that the work results of this section meet or exceed specified requirements.
- G. Design Data: Submit structural calculations stamped by design engineer, for Architect's information and project record.
- H. Test Report: Submit report of full-size mock-up tests for air infiltration, water penetration, and wind performance.
- I. Test Report: Submit test report verifying compliance with NFPA 285 for previously-tested exterior wall assembly.
- J. Manufacturer's Field Reports: Provide within 48 hours of field review. State what was observed and what changes, if any, were requested or required.
- K. Manufacturer's Qualification Statement.
- L. Installer's Qualification Statement.
- M. Testing Agency's Qualification Statement.
- N. Maintenance Data: Care of finishes and warranty requirements.
- O. Executed Warranty: Submit warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- P. Documents showing product compliance with the national and local building code shall be submitted prior to the bid. These documents shall include, but not be limited to, appropriate Evaluation Reports and/or test reports supporting the use of the product

#### **1.07 QUALITY ASSURANCE**

- A. Field Measurements: Verify actual dimensions by field measurement before fabrication; show recorded measurements on shop drawings.
- B. Design Engineer's Qualifications: Design structural supports and anchorages under direct supervision of a Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- C. Manufacturer Qualifications: Company specializing in manufacturing wall panel systems specified in this section.
1. With not less than five years of documented experience.
  2. Approved by MCM sheet manufacturer.
- D. Installer Qualifications: Company specializing in performing work of the type specified in this section.
1. With minimum five years of documented experience.
  2. Approved by wall panel system manufacturer.

- E. Testing Agency Qualifications: Independent agency experienced in testing assemblies of the type required for this project and having the necessary facilities for full-size mock-up testing of the type specified.
- F. Mock-Up: Provide a mock-up for evaluation of fabrication workmanship.
  - 1. Locate where directed.
  - 2. Provide panels finished as specified.
  - 3. Mock-up may remain as part of the work.

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
  - 1. Protect finishes by applying heavy-duty removable plastic film during production.
  - 2. Package for protection against transportation damage.
  - 3. Provide markings to identify components consistently with drawings.
  - 4. Exercise care in unloading, storing, and installing panels to prevent bending, warping, twisting, and surface damage.
- B. Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
  - 1. Store in well-ventilated space out of direct sunlight.
  - 2. Protect from moisture and condensation with tarpaulins or other suitable weathertight covering installed to provide ventilation.
  - 3. Store at a slope to ensure positive drainage of accumulated water.
  - 4. Do not store in enclosed space where ambient temperature can exceed 120 degrees F.
  - 5. Avoid contact with other materials that might cause staining, denting, or other surface damage.

#### **1.09 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion, including defects in water tightness and integrity of seals for insulated metal wall panel systems.
- C. Correct defective work within a thirty (30) year period after Date of Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Metal Composite Material (MCM) Sheet Manufacturers:
  - 1. 3A Composites USA; Alucobond Plus: [www.3Acompositesusa.com/#sle](http://www.3Acompositesusa.com/#sle).
  - 2. Alcotex, Inc; Alcotex PE - Aluminum Composite Material (ACM): [www.alcotex.com/#sle](http://www.alcotex.com/#sle).
  - 3. Alfrex, LLC; Alfrex fr: [www.alfrexusa.com/#sle](http://www.alfrexusa.com/#sle).
  - 4. ALPOLIC Materials; ALPOLIC/fr (Fire Retardant core): [www.alpolic-america.com/#sle](http://www.alpolic-america.com/#sle).
  - 5. Alucoil North America LLC; larson by Alucoil, FR Core (fire resistant): [www.alucoilnorthamerica.com/#sle](http://www.alucoilnorthamerica.com/#sle).
  - 6. ATAS International, Inc; SterraCore: [www.atas.com/#sle](http://www.atas.com/#sle).
  - 7. Substitutions: See Section 01 60 00 - Product Requirements.

#### **2.02 WALL PANEL SYSTEM**

- A. Wall Panel System: Metal panels, fasteners, and anchors designed to be supported by framing or other substrate provided by others; provide installed panel system capable of maintaining

specified performance without defects, damage, or failure.

1. Provide structural design by or under direct supervision of a Structural Engineer licensed in the State in which the Project is located.
2. Provide panel jointing and weatherseal using a "wet", sealant-sealed system.
3. Anchor panels to supporting framing without exposed fasteners.

### **2.03 PERFORMANCE REQUIREMENTS**

- A. Thermal Movement: Provide for free and noiseless vertical and horizontal thermal movement due to expansion and contraction under material temperature range of minus 20 degrees F to 180 degrees F without buckling, opening of joints, undue stress on fasteners, or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.
1. Wind Performance: Provide system tested in accordance with ASTM E330/E330M without permanent deformation or failures of structural members under the following conditions:
  2. Design Wind Pressure: As specified in Structural Drawings.
  3. Panels shall be designed to withstand the Design Wind Load based upon the local building code, but in no case less than 20 pounds per square foot (psf) and 30 psf on parapet and corner panels. Wind load testing shall be conducted in accordance with ASTM E330 to obtain the following results
  4. Maximum deflection of perimeter framing member of  $L/175$  normal to plane of the wall; maximum deflection of individual panels of  $L/60$ .
  5. Maximum anchor deflection in any direction of  $1/16$  inch at connection points of framing members to anchors.
  6. At  $1-1/2$  times design pressure, permanent deflections of framing members shall not exceed  $L/100$  of span length and components shall not experience failure or gross permanent distortion. At connection points of framing members to anchors, permanent set shall not exceed  $1/16$ ".
- B. Air Leakage: 0.10 cfm/sq ft maximum leakage when tested at 1.57 psf pressure difference in accordance with ASTM E283/E283M.
- C. Water Penetration: No water penetration under static pressure when tested in accordance with ASTM E331 at a differential of 10 percent of inward acting design load, 6.27 psf minimum, after 15 minutes.
1. Water penetration is defined as the appearance of uncontrolled water on the interior face of the wall.
  2. Design to drain leakage and condensation to the exterior face of the wall.
- D. Fire Performance: Tested in accordance with, and complying with acceptance criteria of NFPA 285.

### **2.04 PANELS**

- A. Panels: 1 inch deep pans formed of metal composite material sheet by routing back edges of sheet, removing corners, and folding edges.
1. Reinforce corners with riveted aluminum angles.
  2. Provide concealed attachment to supporting structure by adhering attachment members to back of panel; attachment members may also function as stiffeners.
  3. Maintain maximum panel bow of 0.8 percent of panel dimension in width and length; provide stiffeners of sufficient size and strength to maintain panel flatness without showing local stresses or read-through on panel face.

4. Secure members to back face of panels using structural silicone sealant approved by MCM sheet manufacturer.
5. Fabricate panels under controlled shop conditions.
6. Where final dimensions cannot be established by field measurement before commencement of manufacturing, make allowance for field adjustments without requiring field fabrication of panels.
7. Fabricate as indicated on drawings and as recommended by MCM sheet manufacturer.
  - a. Make panel lines, breaks, curves, and angles sharp and true.
  - b. Keep plane surfaces free from warp or buckle.
  - c. Keep panel surfaces free of scratches or marks caused during fabrication.
8. Provide joint details providing a watertight and structurally sound wall panel system that allows no uncontrolled water penetration on inside face of panel system.

## 2.05 MATERIALS

- A. Metal Composite Material (MCM) Sheet: Two sheets of aluminum sandwiching a core of extruded thermoplastic material; no foamed insulation material content.
  1. Overall Sheet Thickness: 0.157 inch (4 mm).
  2. Alloy: Manufacturer's standard, selected for best appearance and finish durability.
  3. Bond and Peel Strength: No adhesive failure of the bond between the core and the skin nor cohesive failure of the core itself below 22.4 inch-pound/inch with no degradation in bond performance, when tested in accordance with ASTM D1781, simulating resistance to panel delamination, after 8 hours of submersion in boiling water and after 21 days of immersion in water at 70 degrees F.
  4. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
  5. Flammability: Self-ignition temperature of 650 degrees F or greater when tested in accordance with ASTM D1929.
- B. Metal Framing Members: Include sub-girts, zee-clips, base and sill angles and channels, hat-shaped and rigid channels, and furring channels required for complete installation.
  1. Provide material strength, dimensions, configuration as required to meet the applied loads applied and in compliance with applicable building code.
  2. Sheet Steel Components: ASTM A653/A653M galvanized to G90/Z275 or zinc-iron alloy-coated to A60/ZF180; or ASTM A792/A792M aluminum-zinc coated to AZ60/AZM180.
  3. Stainless Steel Sheet Components: ASTM A480/A480M.
  4. Aluminum Components: ASTM B209 (ASTM B209M); or ASTM B221 (ASTM B221M).

## 2.06 FINISHES

- A. Factory Finish: Three coat fluoropolymer resin coating, approved by coating manufacturer for length of warranty specified for project, and applied by coil manufacturing facility that specializes in coil applied finishes.
  1. Coating Flexibility: Pass ASTM D4145 minimum 1T Bend at time of manufacturing.
  2. Long-Term Performance: Not less than that specified under WARRANTY in PART 1.
- B. Fluoropolymer Coil Coating System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, with at least 80 percent of coil coated aluminum surfaces having minimum total dry film thickness (DFT) of 0.9 mils, 0.0009 inch; color and gloss as selected by Architect from manufacturer's standard line.
  1. Manufacturers:
    - a. PPG Metal Coatings; Duranar: [www.ppgmetalcoatings.com/#sle](http://www.ppgmetalcoatings.com/#sle).

- b. Sherwin-Williams Company; Fluropon: [www.coil.sherwin.com/#sle](http://www.coil.sherwin.com/#sle).
- c. Substitutions: See Section 01 60 00 - Product Requirements.

C. Color/Texture: As selected by Architect from manufacturer's full range.

## 2.07 ACCESSORIES

- A. Flashing: Sheet aluminum; 0.040 inch thick, minimum; finish and color to match MCM sheet; refer to Section 07 62 00 for additional requirements.
- B. Cladding Support Clips: Thermally-broken, galvanized steel clips for support of cladding z-girts, angles, channels and other framing.
  - 1. Galvanized Steel Sheet: ASTM A653/A653M, with G90/Z275 galvanized coating.
- C. Anchors, Clips, and Accessories: Use one of the following:
  - 1. Stainless steel complying with ASTM A276/A276M, ASTM A480/A480M, or ASTM A666.
  - 2. Steel complying with ASTM A36/A36M and hot-dipped galvanized to ASTM A153/A153M.
  - 3. Steel complying with ASTM A36/A36M and hot-dipped galvanized to ASTM A123/A123M Coating Grade 10.
- D. Fasteners:
  - 1. Exposed Fasteners: Stainless steel; permitted only where absolutely unavoidable and subject to prior approval of the Architect.
  - 2. Screws: Self-drilling or self-tapping Type 410 stainless steel or zinc-alloy steel hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of metal wall panels.
  - 3. Bolts: Stainless steel.
  - 4. Fasteners for Flashing and Trim: Blind fasteners of high-strength aluminum or stainless steel.
- E. Bituminous Coating: Cold-applied asphalt mastic, noncorrosive compound free of asbestos, sulfur, and other deleterious impurities; 15-mil dry film thickness per coat.
- F. Joint Sealer: Provide color to match wall panels silicone sealant of type approved by MCM sheet manufacturer, and in compliance with ASTM C920.
  - 1. Refer to Section 07 92 00 for additional requirements.
- G. Provide panel system manufacturer's and installer's standard corrosion resistant accessories, including fasteners, clips, anchorage devices, and attachments.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Examine dimensions, tolerances, and interfaces with other work.
- B. Examine substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturer's written instructions.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. Notify Architect in writing of conditions detrimental to proper and timely completion of work, and do not proceed with erection until unsatisfactory conditions have been corrected.

### 3.02 PREPARATION

- A. Protect adjacent work areas and finish surfaces from damage during installation.

### 3.03 INSTALLATION

- A. Do not install products that are defective, including warped, bowed, dented, and broken members, and members with damaged finishes.
- B. Comply with instructions and recommendations of MCM sheet manufacturer and wall system manufacturer, as well as with approved shop drawings.
- C. Install wall system securely allowing for necessary thermal and structural movement; comply with wall system manufacturer's instructions for installation of concealed fasteners.
- D. Do not handle or tool products during erection in manner that damages finish, decreases strength, or results in visual imperfection or failure in performance. Return component parts that require alteration to shop for refabrication, if possible, or for replacement with new parts.
- E. Do not form panels in field unless required by wall system manufacturer and approved by the Architect; comply with MCM sheet manufacturer's instructions and recommendations for field forming.
- F. Separate dissimilar metals; use gasket fasteners, isolation shims, or isolation tape where needed to eliminate possibility of electrolytic action between metals.
- G. Where joints are designed for field-applied sealant, seal joints completely with specified sealant.
- H. Install flashings as indicated on shop drawings. At flashing butt joints, provide a lap strap under flashing and seal lapped surfaces with a full bed of non-hardening sealant.
- I. Install square, plumb, straight, and true, accurately fitted, with tight joints and intersections maintaining the following installation tolerances:
  - 1. Variation From Plane or Location: 1/2 inch in 30 feet of length and up to 3/4 inch in 300 feet, maximum.
  - 2. Deviation of Vertical Member From True Line: 0.1 inch in 25 feet run, maximum.
  - 3. Deviation of Horizontal Member From True Line: 0.1 inch in 25 feet run, maximum.
  - 4. Offset From True Alignment Between Two Adjacent Members Abutting End To End, In Line: 0.03 inch, maximum.
- J. Replace damaged products.
  - 1. Exception: Field repairs of minor damage to finishes are permitted only when approved in writing by Architect, panel manufacturer, and fabricator.
  - 2. Field Repairs to Finishes: Using materials and methods sufficient that repairs are not discernible when viewed at distance of 10 feet under all typical light conditions experienced at the project.

### 3.04 FIELD QUALITY CONTROL

- A. Wall System Manufacturer's Field Services: Provide field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with instructions.
- B. Site Visits: Schedule two site visits during execution of installation.

### 3.05 CLEANING

- A. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.
- B. Remove protective film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.
- C. Remove temporary coverings and protection of adjacent work areas.



D. Clean installed products in accordance with manufacturer's instructions.

**3.06 PROTECTION**

A. Protect installed panel system from damage until Date of Substantial Completion.

**END OF SECTION**

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**SECTION 07 54 00**  
**THERMOPLASTIC-POLYOLEFIN (TPO) MEMBRANE ROOFING**

**1PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Adhered system with thermoplastic (TPO) roofing membrane.
- B. Insulation, flat and tapered.
- C. Flashings.
- D. Roofing stack boots, roofing expansion joints, and walkway pads.
- E. Comply with the published recommendations and instructions of the roofing membrane manufacturer.
- F. Commencement of work by Contractor shall constitute acknowledgement by Contractor that this specification can be satisfactorily executed, under the project conditions and with all necessary prerequisites for warranty acceptance by roofing membrane manufacturer. No modification of the Contract Sum will be made for failure to adequately examine the Contract Documents or the project conditions.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Wood nailers and curbs.
- B. Section 07 62 00 - Sheet Metal Flashing and Trim: Counterflashings and reglets.

**1.03 REFERENCE STANDARDS**

- A. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems; 2017.
- B. ASTM C473 - Standard Test Methods for Physical Testing of Gypsum Panel Products; 2019.
- C. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
- D. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2022.
- E. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
- F. ASTM C1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer; 2016.
- G. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.
- H. ASTM D6878/D6878M - Standard Specification for Thermoplastic Polyolefin-Based Sheet Roofing; 2021.
- I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.
- J. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2020.
- K. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C; 2019a.

- L. FM (AG) - FM Approval Guide; current edition.
- M. FM 4470 - Approval Standard for Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction; 2016.
- N. FM DS 1-28 - Wind Design; 2015, with Editorial Revision (2022).
- O. FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components; 2016, with Editorial Revision (2020).
- P. NRCA (RM) - The NRCA Roofing Manual; 2024.
- Q. NRCA (WM) - The NRCA Waterproofing Manual; 2021.
- R. UL (FRD) - Fire Resistance Directory; Current Edition.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week before starting work of this section.
  - 1. Review preparation and installation procedures and coordinating and scheduling required with related work.
    - a. Require attendance with all parties directly influencing the quality of roofing work or affected by the performance of roofing work.
    - b. Notify Architect well in advance of meeting.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, surfacing, and fasteners. Comply with the specified requirements and with the membrane manufacturer's requirements and recommendations for the system type specified; include data for each product used in conjunction with roofing membrane.
  - 1. Technical data sheet for roof membrane.
  - 2. Technical data sheet for each insulation type.
  - 3. Technical data sheet for each cover board type.
  - 4. Technical data sheet for each type of metal edging.
  - 5. Where UL or FM requirements are specified, provide documentation that shows that the roofing system to be installed is UL-Classified or FM-approved, as applicable; include data itemizing the components of the classified or approved system.
- C. Shop Drawings: Submit drawings that indicate joint or termination detail conditions, conditions of interface with other materials, setting plan for tapered insulation, and paver layout. The roof membrane manufacturer's standard details customized for this project for all relevant conditions, including flashings, base tie-ins, roof edges, terminations, expansion joints, penetrations, and drains. For tapered insulation, provide project-specific layout and dimensions for each board.
- D. Manufacturer's Installation Instructions marked up to show exactly how all components will be installed; where instructions allow installation options, clearly indicate which option will be used: Indicate membrane seaming precautions and perimeter conditions requiring special attention.
- E. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.
- F. Installer's qualification statement. Letter from manufacturer attesting that the roofing installer meets the specified qualifications.

- G. Specimen Warranty: For approval. Submit prior to starting work.
- H. Pre-Installation Notice: Copy to show that manufacturer's required Pre Installation Notice (PIN) has been accepted and approved by the manufacturer.
- I. Warranty Documentation:
  - 1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
  - 2. Submit installer's written verification that installation complies with warranty conditions for waterproof membrane.

#### 1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum ten (10) years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of this section with at least five (5) years of documented experience.
  - 1. Current approval, license, or authorization as applicator by the manufacturer.
  - 2. At least five years experience in installing specified system.
  - 3. Capability to provide payment and performance bond to building owner.
- C. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- D. Fire-Test-Response Characteristics: Provide roofing materials with the fire test-response characteristics indicated as determined by testing identical products per test method below by UL, FM, or another testing and inspection agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
  - 1. Fire-Resistance Ratings: ASTM E119 for fire-resistance-rated roof assemblies of which roofing is a part.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. See Section 01 74 19 - Construction Waste Management and Disposal for packaging waste requirements.
- B. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact and legible.
- C. Store materials in weather protected environment, clear of ground and moisture.
- D. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
- E. Protect foam insulation from direct exposure to sunlight.
- F. Keep combustible materials away from ignition sources.

#### 1.08 FIELD CONDITIONS

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane when ambient temperature is below 40 degrees F or above 104 degrees F.
- C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- E. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

**1.09 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Comply with all warranty procedures required by manufacturer, including notifications, scheduling, and inspections.
- C. System Warranty: Provide manufacturer's system warranty agreeing to repair or replace roofing that leaks or is damaged due to wind or other natural causes.
  - 1. Warranty Term: 20 years from date of final acceptance.
  - 2. For repair and replacement include costs of both material and labor in warranty.
  - 3. Limit of Liability: No dollar limitation, non-pro-rated.
  - 4. Full System Warranty covering membrane, roof insulation, cover board, edge metal and coping and other indicated components of the system, for the term indicated and from date of final acceptance.
  - 5. Scope of Coverage: Repair leaks in the roofing system caused by:
    - a. Ordinary wear and tear of the elements.
    - b. Manufacturing defect in membrane manufacturer's brand materials.
    - c. Defective workmanship used to install these materials.
    - d. Damage due to winds up to 72 mph.
  - 6. Exceptions are not Permitted:
    - a. Damage due to roof traffic. Unintentional damage due to normal rooftop inspections, maintenance, or service.
    - b. Damage due to winds in excess of 72 mph.
    - c. Damage due hurricanes or tornadoes.
    - d. Hail.
    - e. Intentional damage.
- D. Installer's Warranty: Roofing installer's warranty for a period of five years from date of Substantial Completion, covering all components of roofing system, including roofing membrane, base flashing and roof insulation.
- E. Metal Roof Edging with Exposed Decorative Fascia: Provide 20-year warranty for painted finish covering color fade, chalk, and film integrity. Firestone full-system warranty for roof edge system, covering blow-off from winds up to 72 mph. Tie into roofing membrane warranty as edge to edge.

**2PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Thermoplastic Polyolefin (TPO) Membrane Roofing Materials:
  - 1. Basis of Design: Elevate; 60 mil UltraPLY TPO:
  - 2. Roofing systems manufactured by the companies listed below are acceptable provided they are completely equivalent in materials and warranty conditions:
    - a. Genflex Roofing Systems, Inc
    - b. Carlisle Roofing Systems, Inc
    - c. Johns Manville

- 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Manufacturer of Metal Roof Edging: Same manufacturer as roof membrane.
- C. Manufacturer of Roof Insulation and Cover Boards: Same manufacturer as roof membrane.
  - 1. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 ROOFING SYSTEM DESCRIPTION**

- A. Thermoplastic Membrane Roofing: One ply membrane, fully adhered, over insulation.
- B. Roofing Assembly Requirements:
  - 1. Membrane Attachment: Fully adhered.
  - 2. Warranty: Full system warranty covering membrane, roof insulation, membrane accessories, and metal edging and coping.
  - 3. Comply with applicable local building code requirements.
  - 4. Roof Covering External Fire Resistance Classification: UL (FRD) Class A.
  - 5. Factory Mutual Classification: Class 1 and windstorm resistance of 1-90, in accordance with FM DS 1-28 and FM DS 1-29.
- C. Acceptable Insulation Types - Constant Thickness Application:
  - 1. Polyisocyanurate Insulation R-value of 20 (LTTR), minimum. Maximum board thickness not to exceed 2-inches per layer of polyisocyanurate board. Board Type 2, Class 1, Grade 2 and size to be 48" X 96".
  - 2. Attachment: Polyisocyanurate foam board, non-composite; commonly attached.
- D. Acceptable Insulation Types - Tapered Application:
  - 1. Slope as indicated; provide minimum R-value at thinnest point; place tapered layer on bottom.
  - 2. Crickets: Tapered insulation of same type as specified for top layer; slope as indicated.

**2.03 MEMBRANE ROOFING AND ASSOCIATED MATERIALS**

- A. Membrane Roofing Materials: Flexible, heat weldable sheet composed of thermoplastic polyolefin polymer and ethylene propylene rubber; with polyester weft inserted reinforcement and the following additional characteristics:
  - 1. TPO: Thermoplastic polyolefin (TPO) complying with ASTM D6878/D6878M, sheet contains reinforcing fabrics or scrim.
  - 2. Thickness: 60 mil, 0.060 inch, nominal.
  - 3. Sheet Width: Factory fabricated into widest possible sheets.
  - 4. Solar Reflectance: 0.79, minimum, when tested in accordance with ASTM C1549.
  - 5. Color: White.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Membrane Fasteners: As recommended and approved by membrane manufacturer. Type and size as required by roof membrane manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane manufacturer.
- D. Flexible Flashing Material: Same material as membrane.
- E. Curb and Parapet Flashing: Same material as membrane, with encapsulated edge which eliminates need for seam sealing the flashing-to-roof splice; precut to 18 inches wide.
- F. Formable Flashing: Non-reinforced, flexible, heat weldable sheet, composed of thermoplastic polyolefin polymer and ethylene propylene rubber.

1. Thickness: 0.060 inch plus/minus 10 percent.
  2. Tensile Strength: 1550 psi, minimum, when tested in accordance with ASTM D638 after heat aging.
  3. Elongation at Break: 650 percent, minimum, when tested in accordance with ASTM D638 after heat aging.
  4. Tearing Strength: 12 lbf, minimum, when tested in accordance with ASTM D1004 after heat aging.
  5. Color: White.
  6. Product provided by membrane manufacturer.
- G. Tape Flashing: 5-1/2 inch nominal wide TPO membrane laminated to cured rubber polymer seaming tape, overall thickness 0.065 inch nominal; TPO Flashing by approved membrane manufacturer.
- H. Bonding Adhesive: Neoprene and SBR rubber blend, formulated for compatibility with the membrane other substrate materials, including masonry, wood, and insulation facings; Bonding Adhesive by approved membrane manufacturer.
- I. Pourable Sealer: Two-part polyurethane, two-color for reliable mixing; Pourable Sealer by approved membrane manufacturer.
- J. Seam Plates: Steel with barbs and Galvalume coating; corrosion-resistance complying with FM 4470.
- K. Termination Bars: Aluminum bars with integral caulk ledge; 1.3 inches wide by 0.10 inch thick; Termination Bar by membrane manufacturer.
- L. Cut Edge Sealant: Synthetic rubber-based, for use where membrane reinforcement is exposed; TPO Cut Edge Sealant by approved membrane manufacturer.
- M. General Purpose Sealant: EPDM-based, one part, white general purpose sealant; UltraPly TPO General Purpose Sealant by approved membrane manufacturer.
- N. Molded Flashing Accessories: Unreinforced TPO membrane pre-molded to suit a variety of flashing details, including pipe boots, inside corners, outside corners, etc.; TPO Small and Large Pipe Flashing by approved membrane manufacturer.
- O. Water Block Seal: Butyl rubber sealant for use between two surfaces, not exposed; Water Block Seal by approved membrane manufacturer.
- P. Roof Walkway Pads: Non-reinforced TPO walkway pads, 0.130 inch by 30 inches by 40 feet long with patterned traffic bearing surface; TPO Walkway Pads by approved membrane manufacturer.
- a. Spanning Capability: Recommended by manufacturer for flute spans indicated on drawings.
  - b. Surface Burning Characteristics: Flame spread index of 0 (zero), smoke developed index of 0 (zero), when tested in accordance with ASTM E84.
  - c. Combustibility: Non-combustible, when tested in accordance with ASTM E136.
  - d. Factory Mutual approved for use with FM 1-60 and 1-90 rated roofing assemblies.
  - e. Mold Growth Resistance: Zero growth, when tested in accordance with ASTM D3273 for minimum of 4 weeks.

**2.04 INSULATION**

- A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
1. Classifications:



- a. Type II:
  - 1) Class 1 - Faced with glass fiber reinforced cellulosic felt facers on both major surfaces of core foam.
  - 2) Compressive Strength: Grade 2, 20 psi (138 kPa), minimum.
  - 3) Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.
  - 4) Recycled Content: 19 percent post-consumer and 15 percent pre-consumer (post-industrial), average.
  - 5) Acceptable Product: Polyisocyanurate Insulation supplied by or approved by membrane manufacturer.
- 2. Board Size: 48 by 96 inches.
  - a. Exception: Insulation to be attached using adhesive or asphalt may be no larger than 48 inches by 48 inches, nominal.
- 3. Board Thickness: 2 layers of 2".
- B. Insulation Fasteners: Type and size as required by roof membrane manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane manufacturer.

**2.05 METAL ACCESSORIES**

- A. Metal Roof Edging and Fascia: Continuous metal edge member serving as termination of roof membrane and retainer for metal fascia; watertight with no exposed fasteners; mounted to roof edge nailer.
  - 1. Wind Performance:
    - a. Membrane Pull-Off Resistance: 100 lbs/ft, minimum, when tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test method RE-1.
    - b. Fascia Pull-Off Resistance: At least minimum required when tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test method RE-2.
    - c. Provide product listed in FM (AG) with at least FM 1-270 rating.
  - 2. Fascia Face Height: 5 inches, or as indicated on drawings.
  - 3. Edge Member Height Above Nailers: 1-1/4 inches.
  - 4. Length: 144 inches.
  - 5. Functional Characteristics: Fascia retainer supports while allowing for free thermal cycling of fascia.
  - 6. Aluminum Bar: Continuous 6063-T6 alloy aluminum extrusion with pre-punched slotted holes; miters welded; injection molded EPDM splices to allow thermal expansion.
  - 7. Anchor Bar Cleat: 20 gauge, 0.036 inch G90 coated commercial type galvanized steel with pre-punched holes.
  - 8. Curved Applications: Factory modified.
  - 9. Fasteners: Factory-provided corrosion resistant fasteners, with drivers; no exposed fasteners permitted.
  - 10. Special Shaped Components: Provide factory-fabricated pieces necessary for complete installation, including miters, scuppers, and end caps; minimum 14 inch long legs on corner pieces.
  - 11. Scuppers: Welded watertight.
  - 12. Accessories: Provide matching brick wall cap, downspout, extenders, and other special fabrications as shown on the drawings.

- B. Metal Roof Drip Edge: Continuous membrane clad metal edge member serving as termination of roof membrane; watertight with no exposed fasteners; mounted to roof edge nailer.
1. Wind Performance:
    - a. Pull-Off Resistance: 282 lbs/ft, minimum, when tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test method RE-1.
  2. Fascia Face Height: 5 inches, or as indicated on drawings.
  3. Edge Member Height Above Nailer: 1-1/4 inches.
  4. Length: 144 inches.
  5. Cleat: 22 gauge, 0.036 inch G90 coated commercial type galvanized steel with pre-punched holes.
  6. Curved Applications: Factory modified.
  7. Fasteners: Factory-provided corrosion resistant fasteners, with drivers; no exposed fasteners permitted.
  8. Special Shaped Components: Provide factory-fabricated pieces necessary for complete installation, including miters, scuppers, and end caps; minimum 14 inch long legs on corner pieces.
  9. Accessories: Provide matching brick wall cap, downspout, extenders, and other special fabrications as shown on the drawings.
- C. Parapet Copings: Formed metal coping with galvanized steel anchor/support cleats for capping any parapet wall; watertight, maintenance free, without exposed fasteners; butt type joints with concealed splice plates; mechanically fastened as indicated.
1. Wind Performance:
    - a. At least minimum required when tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test method RE-3.
    - b. Provide product listed in FM (AG) with at least FM 1-90 rating.
  2. Description: Coping sections allowed to expand and contract freely while locked in place on anchor cleats by mechanical pressure from hardened stainless steel springs factory attached to anchor cleats; 8 inch wide splice plates with factory applied dual non-curing sealant strips capable of providing watertight seal.
  3. Dimensions:
    - a. Wall Width: As indicated on the drawings.
    - b. Piece Length: Minimum 144 inches.
    - c. Curved Application: Factory fabricated in true radius.
  4. Anchor/Support Cleats: 20 gauge, 0.036 inch thick prepunched galvanized cleat with 12 inch wide stainless steel spring mechanically locked to cleat at 72 inches on center.
  5. Special Shaped Components: Provide factory-fabricated pieces necessary for complete installation, including miters, corners, intersections, curves, pier caps, and end caps; minimum 14 inch long legs on corner, intersection, and end pieces.
  6. Fasteners: Factory-furnished; electrolytically compatible; minimum pull out resistance of 240 pounds for actual substrate used; no exposed fasteners.
  7. Approved Product: Elevate Coping

## 2.06 ACCESSORIES

- A. Wood Nailers: PS 20 dimension lumber, Structural Grade No. 2 or better Southern Pine, Douglas Fir; or PS 1, APA Exterior Grade plywood; pressure preservative treated.

1. Width: 3-1/2 inches, nominal minimum, or as wide as the nailing flange of the roof accessory to be attached to it.
2. Thickness: Same as thickness of roof insulation.

B. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.

### **3PART 3 EXECUTION**

#### **3.01 GENERAL**

- A. Install roofing, insulation, flashings, and accessories in accordance with roofing manufacturer's published instructions and recommendations for the specified roofing system. Where manufacturer provides no instructions or recommendations, follow good roofing practices and industry standards. Comply with federal, state, and local regulations.
- B. Obtain all relevant instructions and maintain copies at project site for duration of installation period.
- C. Do not start work until Pre-Installation Notice has been submitted to manufacturer as notification that this project requires a manufacturer's warranty.
- D. Perform work using competent and properly equipped personnel.
- E. Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.
- F. Install roofing membrane only when surfaces are clean, dry, smooth and free of snow or ice; do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application; consult manufacturer for recommended procedures during cold weather. Do not work with sealants and adhesives when material temperature is outside the range of 60 to 80 degrees F.
- G. Protect adjacent construction, property, vehicles, and persons from damage related to roofing work; repair or restore damage caused by roofing work.
  1. Protect from spills and overspray from bitumen, adhesives, sealants and coatings.
  2. Particularly protect metal, glass, plastic, and painted surfaces from bitumen, adhesives, and sealants within the range of wind-borne overspray.
  3. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trades.
- H. Until ready for use, keep materials in their original containers as labeled by the manufacturer.
- I. Consult membrane manufacturer's instructions, container labels, and Material Safety Data Sheets (MSDS) for specific safety instructions. Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.

#### **3.02 EXAMINATION**

- A. Examine roof deck to determine that it is sufficiently rigid to support installers and their mechanical equipment and that deflection will not strain or rupture roof components or deform deck.
- B. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work.
- C. Verify deck is supported and secure.

- D. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- E. Verify deck surfaces are dry and free of snow or ice.
- F. Examine roof substrate to verify that it is properly sloped to drains.
- G. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.
- H. Verify that the specifications and drawing details are workable and not in conflict with the roofing manufacturer's recommendations and instructions; start of work constitutes acceptable of project conditions and requirements.
- I. Verify that wood nailers have been properly installed.

### 3.03 PREPARATION - METAL DECK

- A. Install deck type x sheathing on metal deck:
  - 1. Lay with long side at right angle to flutes; stagger end joints; provide support at ends.
  - 2. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.
  - 3. Tape joints.

### 3.04 PREPARATION, GENERAL

- A. Take appropriate measures to ensure that fumes from adhesive solvents are not drawn into the building through air intakes.
- B. Prior to proceeding, prepare roof surface so that it is clean, dry, and smooth, and free of sharp edges, fins, roughened surfaces, loose or foreign materials, oil, grease and other materials that may damage the membrane.
- C. Fill all surface voids in the immediate substrate that are greater than 1/4 inch wide with fill material acceptable insulation to membrane manufacturer.
- D. Seal, grout, or tape deck joints, where needed, to prevent bitumen seepage into building.
- E. Wood Nailers: Provide wood nailers at all perimeters and other locations where indicated on the drawings, of total height matching the total thickness of insulation being used.

### 3.05 INSTALLATION, GENERAL

- A. Perform work in accordance with manufacturer's instructions, NRCA (RM), and NRCA (WM) applicable requirements.
- B. Do not apply roofing membrane during cold or wet weather conditions.
- C. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.
- D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- F. Beginning at low point of roof, place membrane without stretching over substrate and allow to relax at least 30 minutes before attachment or splicing; in colder weather allow for longer relax time.
- G. Lay out the membrane pieces so that field and flashing splices are installed to shed water.

- H. Install membrane without wrinkles and without gaps or fishmouths in seams; bond and test seams and laps in accordance with membrane manufacturer's instructions and details.
- I. Install membrane adhered to the substrate, with edge securement as specified.
- J. Adhered Membrane: Bond membrane sheet to substrate using membrane manufacturer's recommended bonding material, application rate, and procedures.
- K. Edge Securement: Secure membrane at all locations where membrane terminates or goes through an angle change greater than 2 in 12 inches using mechanically fastened reinforced perimeter fastening strips, plates, or metal edging as indicated or as recommended by roofing manufacturer.
  - 1. Exceptions: Round pipe penetrations less than 18 inches in diameter and square penetrations less than 4 inches square.
  - 2. Metal edging is not merely decorative; ensure anchorage of membrane as intended by roofing manufacturer.

### 3.06 INSTALLATION - INSULATION, UNDER MEMBRANE

- A. Attachment of Coverboard and Insulation:
  - 1. In conjunction with coverboard mechanically fasten insulation to deck in accordance with roofing manufacturer's instructions and FM DS 1-28 Factory Mutual requirements. Using specified fasteners and insulation plates engage fasteners through insulation into deck to depth and in pattern required by Factory Mutual for FM Class specified in PART 2 and membrane manufacturer, whichever is more stringent.
- B. Provide insulation stops slopes on 1"/12" or greater.
- C. Lay subsequent layers of insulation and coverboard with joints staggered minimum 6 inches from joints of preceding layer.
- D. Neatly and tightly fit insulation to all penetrations, projections, and nailers, with gaps not greater than 1/4 inch. Fill gaps greater than 1/4 inch with acceptable insulation. Do not leave the roofing membrane unsupported over a space greater than 1/4 inch.
- E. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
- F. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.
- G. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- H. Do not install more insulation than can be covered with membrane in same day or before the onset of inclement weather.

### 3.07 INSTALLATION - MEMBRANE

- A. Beginning at low point of roof, place membrane without stretching over substrate and allow to relax at least 30 minutes before attachment or splicing; in colder weather allow for longer relax time.
- B. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- C. Shingle joints on sloped substrate in direction of drainage.
- D. Strap membranes on slopes 1"/12" or greater.

- E. Install membrane without wrinkles and without gaps or fishmouths in seams; bond and test seams and laps in accordance with membrane manufacturer's instructions and details.
- F. Adhered Membrane: Bond membrane sheet to substrate using membrane manufacturer's recommended bonding material, application rate, and procedures.
- G. Install membrane adhered to the substrate, with edge securement as specified.
- H. Edge Securement: Secure membrane at all locations where membrane terminates or goes through an angle change greater than 2 in 12 inches using mechanically fastened reinforced perimeter fastening strips, plates, or metal edging as indicated or as recommended by roofing manufacturer.
  - 1. Exceptions: Round pipe penetrations less than 18 inches in diameter and square penetrations less than 4 inches square.
  - 2. Metal edging is not merely decorative; ensure anchorage of membrane as intended by roofing manufacturer.
- I. Around roof penetrations, seal flanges and flashings with flexible flashing.
- J. Coordinate installation of roof drains and sumps and related flashings.

### 3.08 FLASHING AND ACCESSORIES INSTALLATION

- A. Install flashings, including laps, splices, joints, bonding, adhesion, and attachment, as required by membrane manufacturer's recommendations and details.
- B. Metal Accessories: Install metal edgings, gravel stops, and copings in locations indicated on the drawings, with horizontal leg of edge member over membrane and flashing over metal onto membrane.
  - 1. Follow roofing manufacturer's instructions.
  - 2. Remove protective plastic surface film immediately before installation.
  - 3. Install water block sealant under the membrane anchorage leg.
  - 4. Flash with manufacturer's recommended flashing sheet unless otherwise indicated.
  - 5. Where single application of flashing will not completely cover the metal flange, install additional piece of flashing to cover the metal edge.
  - 6. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, install an additional piece of self-adhesive flashing membrane over the metal lap to the top of the gravel stop; apply seam edge treatment at the intersections of the two flashing sections.
  - 7. When the roof slope is greater than 1:12, apply seam edge treatment along the back edge of the flashing.
- C. Roofing Expansion Joints: Install as shown on drawings and as recommended by roofing manufacturer.
- D. Flashing at Walls, Curbs, and Other Vertical and Sloped Surfaces: Install weathertight flashing at all walls, curbs, parapets, curbs, skylights, and other vertical and sloped surfaces that the roofing membrane abuts to; extend flashing at least 8 inches high above membrane surface.
  - 1. Use the longest practical flashing pieces.
  - 2. Evaluate the substrate and overlay and adjust installation procedure in accordance with membrane manufacturer's recommendations.
  - 3. Complete the splice between flashing and the main roof sheet with specified splice adhesive before adhering flashing to the vertical surface.
  - 4. Provide termination directly to the vertical substrate as shown on roof drawings.

- E. Flashing at Penetrations: Flash all penetrations passing through the membrane; make flashing seals directly to the penetration.
  - 1. Pipes, Round Supports, and Similar Items: Flash with specified pre-molded pipe flashings wherever practical; otherwise use specified self-curing elastomeric flashing.
  - 2. Pipe Clusters and Unusual Shaped Penetrations: Provide penetration pocket at least 2 inches deep, with at least 1 inch clearance from penetration, sloped to shed water.
  - 3. Structural Steel Tubing: If corner radii are greater than 1/4 inch and longest side of tube does not exceed 12 inches, flash as for pipes; otherwise, provide a standard curb with flashing.
  - 4. Flexible and Moving Penetrations: Provide weathertight gooseneck set in sealant and secured to deck, flashed as recommended by manufacturer.

### 3.09 FINISHING AND WALKWAY INSTALLATION

- A. Install walkways at access points to the roof, around rooftop equipment that may require maintenance, and where indicated on the drawings.
- B. Walkway Pads: Adhere to the roofing membrane, spacing each pad at minimum of 1.0 inch and maximum of 3.0 inches from each other to allow for drainage.
  - 1. If installation of walkway pads over field fabricated splices or within 6 inches of a splice edge cannot be avoided, adhere another layer of flashing over the splice and extending beyond the walkway pad a minimum of 6 inches on either side.
  - 2. Prime the membrane, remove the release paper on the pad, press in place, and walk on pad to ensure proper adhesion.

### 3.10 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Provide daily on-site attendance of roofing and insulation manufacturer's representative during installation of this work.
- C. Inspection by Manufacturer: Provide final inspection of the roofing system by a Technical Representative employed by roofing system manufacturer specifically to inspect installation for warranty purposes (i.e. not a sales person).
- D. Perform all corrections necessary for issuance of warranty.

### 3.11 CLEANING

- A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.
- B. Clean all contaminants generated by roofing work from building and surrounding areas, including bitumen, adhesives, sealants, and coatings.
- C. Remove bituminous markings from finished surfaces.
- D. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.
- E. Repair or replace defaced or damaged finishes caused by work of this section.
- F. Remove leftover materials, trash, debris, equipment from project site and surrounding areas.

### 3.12 PROTECTION

- A. Protect installed roofing and flashings from construction operations.

- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

**END OF SECTION**



**SECTION 07 62 00  
SHEET METAL FLASHING AND TRIM**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, and other items indicated in Schedule.
- B. Sealants for joints within sheet metal fabrications.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 92 00 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

**1.03 REFERENCE STANDARDS**

- A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- D. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- E. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- F. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- G. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).
- H. CDA A4050 - Copper in Architecture - Handbook; current edition.
- I. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week before starting work of this section.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Samples: Submit two samples, 6 by 6 inch in size illustrating material of typical standing seam.
- D. Samples: Submit two samples 6 by 6 inch in size illustrating metal finish color.

**1.06 QUALITY ASSURANCE**

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
- B. Maintain one copy of each document on site.

- C. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 3 years of documented experience.

### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

## **PART 2 PRODUCTS**

### **2.01 SHEET MATERIALS**

- A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gauge, (0.0239 inch) thick base metal.
- B. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gauge, (0.0239) inch thick base metal, shop pre-coated with PVDF coating.
1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
  2. Color: As selected by Architect from manufacturer's standard colors.
- C. Pre-Finished Aluminum: ASTM B209 (ASTM B209M); 20 gauge, 0.032 inch thick; plain finish shop pre-coated with fluoropolymer coating.
1. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system.
  2. Color: As selected by Architect from manufacturer's standard colors.

### **2.02 FABRICATION**

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- F. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

### **2.03 GUTTER AND DOWNSPOUT FABRICATION**

- A. Gutters: SMACNA (ASMM) Rectangular profile.
- B. Downspouts: Rectangular profile.
- C. Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 10 years in accordance with SMACNA (ASMM).
- D. Accessories: Profiled to suit gutters and downspouts.
1. Anchorage Devices: In accordance with SMACNA (ASMM) requirements.
  2. Gutter Supports: Brackets.
  3. Downspout Supports: Brackets.
- E. Downspout Boots: Steel.
- F. Downspout Extenders: Same material and finish as downspouts.

- G. Seal metal joints.

#### **2.04 ACCESSORIES**

- A. Fasteners: Galvanized steel, with soft neoprene washers.
- B. Primer: Zinc chromate type.
- C. Protective Backing Paint: Zinc molybdate alkyd.
- D. Concealed Sealants: Non-curing butyl sealant.
- E. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
- F. Plastic Cement: ASTM D4586/D4586M, Type I.
- G. Reglets: Surface mounted type, galvanized steel; face and ends covered with plastic tape.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

#### **3.02 PREPARATION**

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.
- C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

#### **3.03 INSTALLATION**

- A. Comply with drawing details.
- B. Insert flashings into reglets to form tight fit; secure in place with lead wedges; pack remaining spaces with lead wool; seal flashings into reglets with sealant.
- C. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
- D. Apply plastic cement compound between metal flashings and felt flashings.
- E. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- F. Seal metal joints watertight.
- G. Secure gutters and downspouts in place with concealed fasteners.
- H. Slope gutters 1/4 inch per 10 feet, minimum.
- I. Connect downspouts to downspout boots, and grout connection watertight.

#### **3.04 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for field inspection requirements.
- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

**END OF SECTION**

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**SECTION 07 72 00  
ROOF ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Curbs.
- B. Roof penetrations mounting curbs.
- C. Roof hatches, manual and automatic operation, including smoke vents.
- D. Non-penetrating pedestals.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 41 13 - Metal Roof Panels.

**1.03 REFERENCE STANDARDS**

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- C. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
  - 4. Maintenance requirements.
- C. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.
  - 1. Snow Guards: Submit design calculations for loadings and spacings based on manufacturer testing.
  - 2. Submit shop drawings sealed and signed by a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- D. Warranty Documentation:
  - 1. Submit manufacturer warranty.
  - 2. Ensure that forms have been completed in Owner's name and registered with manufacturer.
  - 3. Submit documentation that roof accessories are acceptable to roofing manufacturer, and do not limit the roofing warranty.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.

**1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 ROOF CURBS**

- A. Roof Curbs Mounting Assemblies: Factory fabricated hollow sheet metal construction, internally reinforced, and capable of supporting superimposed live and dead loads and designated equipment load with fully mitered and sealed corner joints welded or mechanically fastened, and integral counterflashing with top and edges formed to shed water.
  - 1. Roof Curb Mounting Substrate: Curb substrate consists of corrugated metal roof deck with insulation.
  - 2. Sheet Metal Material:
    - a. Aluminum: 0.080 inch minimum thickness, with 3003 alloy, and H14 temper.
  - 3. Provide layouts and configurations indicated on drawings.
- B. Pipe, Duct, or Conduit Mounting Curbs: Vertical posts, minimum 8 inches square unless otherwise indicated.

### **2.02 ROOF HATCHES, MANUAL AND AUTOMATIC OPERATION**

- A. Roof Hatch Manufacturers:
- B. Roof Hatches and Smoke Vents: Factory-assembled aluminum frame and cover, complete with operating and release hardware.
  - 1. Style: Provide flat metal covers unless otherwise indicated.
- C. Frames and Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
  - 1. Material: Mill finished aluminum, 11 gauge, 0.0907 inch thick.
  - 2. Insulation: Manufacturer's standard; 1 inch rigid glass fiber, located on outside face of curb.
  - 3. Curb Height: 12 inches from surface of roof deck, minimum.
- D. Metal Covers: Flush, insulated, hollow metal construction.
  - 1. Capable of supporting 40 psf live load.
  - 2. Material: Mill finished aluminum; outer cover 11 gauge, 0.0907 inch thick, liner 0.04 inch thick.
  - 3. Insulation: Manufacturer's standard 1 inch rigid glass fiber.
  - 4. Gasket: Neoprene, continuous around cover perimeter.
- E. Hardware: Steel, zinc coated and chromate sealed, unless otherwise indicated or required by manufacturer.
  - 1. Lifting Mechanisms: Compression or torsion spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf load.
  - 2. Hinges: Heavy duty pintle type.
  - 3. Hold open arm with vinyl-coated handle for manual release.
  - 4. Latch: Upon closing, engage latch automatically and reset manual release.
  - 5. Manual Release: Pull handle on interior.
  - 6. Locking: Padlock hasp on interior.

### **2.03 NON-PENETRATING ROOFTOP SUPPORTS/ASSEMBLIES**

- A. Non-Penetrating Rooftop Support/Assemblies: Manufacturer-engineered and factory-fabricated, with pedestal bases that rest on top of roofing membrane, and not requiring any attachment to roof structure and not penetrating roofing assembly.
  - 1. Design Loadings and Configurations: As required by applicable codes.
  - 2. Height: Provide minimum clearance of 6 inches under supported items to top of roofing.

3. Support Spacing and Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
  4. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
  5. Hardware, Bolts, Nuts, and Washers: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A153/A153M.
- B. Pipe Supports: Provide attachment fixtures complying with MSS SP-58 and as indicated.
- C. Non-Penetrating Pedestals: Steel pedestals with square, round, or rectangular bases.
1. Bases: High density polypropylene.
  2. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
  3. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

#### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

#### **3.04 CLEANING**

- A. Clean installed work to like-new condition.

#### **3.05 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

**END OF SECTION**

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**SECTION 07 84 00  
FIRESTOPPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Firestopping systems.
- B. Firestopping of joints and penetrations in fire-resistance-rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

**1.03 REFERENCE STANDARDS**

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2020.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (Reapproved 2017).
- C. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems; 2015 (Reapproved 2019).
- D. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestop Systems; 2020a.
- E. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers; 2020a.
- F. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus; 2020.
- G. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2013 (Reapproved 2017).
- H. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.
- I. ITS (DIR) - Directory of Listed Products; current edition.
- J. FM 4991 - Approval Standard for Firestop Contractors; 2013.
- K. FM (AG) - FM Approval Guide; current edition.
- L. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).
- M. UL 1479 - Standard for Fire Tests of Penetration Firestops; Current Edition, Including All Revisions.
- N. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.
- O. UL (FRD) - Fire Resistance Directory; Current Edition.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.

- D. Sustainable Design Submittal: Submit VOC content documentation for nonperformed materials.
- E. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- G. Certificate from authority having jurisdiction indicating approval of materials used.
- H. Manufacturer's qualification statement.
- I. Installer's qualification statement.

#### **1.05 QUALITY ASSURANCE**

- A. General: Provide firestopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases.
  - 1. Performance requirements shall meet FM DS 1-21, and UL classified system as indicated, but not necessarily limited to, schedule at end of this Section.
    - a. Listing in the current-year classification or certification books of UL and FM Approval Guide will be considered as constituting an acceptable test report.
  - 2. For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.
  - 3. For firestopping exposed to view, provide products with flame-spread values of less than 25 and smoke-developed values of less than 450, as determined per ASTM E84.
  - 4. Provide materials that expand to fill cavities or adhesion to substrates, and that will maintain seal under normal expected movements of substrates.
- B. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated, ASTM E119, and ASTM E814.
  - 1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
  - 2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at [www.icc-es.org](http://www.icc-es.org) will be considered as constituting an acceptable test report.
- C. Proposed fire stop materials and methods shall conform to applicable governing codes having local jurisdiction.
- D. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.
- E. For those firestop applications that exist for which no qualified tested system is available through a manufacturer, an engineering judgment derived from similar qualified tested system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment documents must follow requirements set forth by the International Firestop Council.
- F. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- G. Installer Qualifications: Company specializing in performing the work of this section and:
  - 1. Trained by manufacturer.
  - 2. Approved by Factory Mutual Research Corporation under FM 4991, or meeting any two of the following requirements:
    - a. Verification of minimum three years documented experience installing work of this type.

- b. Verification of at least five satisfactorily completed projects of comparable size and type.
- c. Licensed by local authorities having jurisdiction (AHJ).

#### **1.06 MOCK-UP**

- A. Install one firestopping assembly representative of each fire rating design required on project.
  - 1. Where one design may be used for different penetrating items or in different wall constructions, install one assembly for each different combination.
  - 2. Where firestopping is intended to fill a linear opening, install minimum of 1 linear ft.
- B. Obtain approval of authorities having jurisdiction (AHJ) before proceeding.
- C. If accepted, mock-up will represent minimum standard for this work.
- D. If accepted, mock-up may remain as part of this work. Remove and replace mock-ups not accepted.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- E. Do not use damaged or expired materials.

#### **1.08 FIELD CONDITIONS**

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.
- B. Provide ventilation in areas where solvent-cured materials are being installed.

### **PART 2 PRODUCTS**

#### **2.01 PERFORMANCE REQUIREMENTS**

- A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- C. Provide a round fire-rated cable management device whenever cables penetrate fire rated walls, where frequent cable changes and additions may occur. The fire-rated cable management device shall consist of a corrugated steel tube with zinc coating, contain and inner plastic housing, intumescent material rings, and inner fabric smoke seal membrane. The length of the sleeve shall be 12.4 inches. The fire-rated cable management device shall contain integrated intumescent firestop wrap strip materials sufficient to maintain the hourly rating of the barrier being penetrated. The fire-rated cable management device shall contain a smoke seal fabric membrane or intumescent firestop plugs sufficient to achieve the L-Rating requirements

of the barrier type. Install device per the manufacturer's published installation instructions.

## **2.02 MATERIALS**

- A. Firestopping Materials: Any materials meeting requirements.
- B. Use only firestop products that have been UL 1479, ASTM E 814 or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- C. Single Source: To maintain control and integrity of the firestop applications a single manufacturer should be used. Specific UL or approved listing agencies systems applicable to each type of firestop condition should be supplied by one manufacturer.
- D. Volatile Organic Compound (VOC) Content: Provide products having VOC content lower than that required by SCAQMD 1168.
- E. Mold and Mildew Resistance: Provide firestopping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.
- F. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.
- G. Fire Ratings: Refer to drawings for required systems and ratings.

## **2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS**

- A. Perimeter Fire Containment Firestopping: Use system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of floor assembly.
- B. Head-of-Wall (HW) Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of wall assembly.
- C. Floor-to-Floor (FF), Floor-to-Wall (FW), Head-of-Wall (HW), and Wall-to-Wall (WW) Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
- D. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.

## **2.04 FIRESTOPPING SYSTEMS**

- A. Provide installed firestop products that limit the spread of fire, heat, smoke, and gasses through otherwise unprotected openings in rated assemblies, including walls, partitions, floors, roof/ceilings, and similar locations, restoring the integrity of the fire rated construction to its original fire rating
- B. Systems used shall be listed in FM P7825 - Approval Guide.
- C. Systems used shall be listed in the UL Fire Resistance Directory under Through-Penetrations Firestop Systems (XHEZ) and Through-Penetration Firestop Devices (XHCR).
- D. Firestopping: Any material meeting requirements.
  - 1. Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814 or UL 1479 with F Rating equal to or greater than the fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify openings are ready to receive the work of this section.

### **3.02 PREPARATION**

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to prevent liquid material from leakage.

### **3.03 COORDINATION**

- A. Coordinate construction of openings, penetrations and construction joints to ensure that the fire stop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- C. Coordinate fire stopping with other trades so that obstructions are not placed in the way prior to the installation of the fire stop systems.

### **3.04 INSTALLATION**

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by Owner's Independent Testing Agency.
- C. Do not cover installed firestopping until inspected by authorities having jurisdiction.
- D. Install labeling required by code.
- E. Install so that openings are completely filled and material is securely adhered.
- F. Where firestopping surface will be exposed to view, finish to a smooth, uniform surface flush with adjacent surfaces.
- G. Notify authority having jurisdiction when firestopping installation is ready for inspection; obtain advance approval of anticipated inspection dates and phasing, if any, required to allow subsequent construction to proceed.
- H. Do not cover firestopping with other construction until approval of authority having jurisdiction has been received.

### **3.05 FIELD QUALITY CONTROL**

- A. Independent Testing Agency: Inspection agency employed and paid by Owner, will examine penetration firestopping in accordance with ASTM E2174, and ASTM E2393.
- B. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.
- C. Manufacturer's Field Services: Contractor to ensure a manufacturer's direct representative is on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. Training will be done per manufacturer's written recommendations published in their literature and drawing details. During installation, contractor shall have manufacturer's representative provide periodic visual observations and written documentation of the results.

### **3.06 IDENTIFICATION AND DOCUMENTATION**

- A. The firestop contractor is to supply documentation for each single application addressed. This documentation is to identify each penetration and joint location on the entire project.
- B. The Documentation Form for through penetrations is to include:
  - 1. A Sequential Location Number
  - 2. The Project Name
  - 3. Date of Installation
  - 4. Detailed Description of the Penetration's Location
  - 5. Tested System or Engineered Judgment Number
  - 6. Type of Assembly Penetrated
  - 7. A Detailed Description of the Size and Type of Penetrating Item
  - 8. Size of Opening
  - 9. Number of Sides of Assemblies Addressed
  - 10. Hourly Rating to be Achieved
  - 11. Installer's Name
- C. Copies of these documents are to be provided to the general contractor at the completion of the project.
- D. Install identification Labels for Through Penetration and Construction Joint Systems: Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
  - 1. The words "Warning - Through Penetration Firestop System - Do not Disturb. Notify Building Management of Any Damage."
  - 2. Listing agency's system number or designation.
  - 3. System manufacturer's name, address, and phone number.
  - 4. Installer's name, address, and phone number.
  - 5. General contractor's name, address, and phone number (if applicable).
  - 6. Date of installation.

### **3.07 CLEANING**

- A. Clean adjacent surfaces of firestopping materials.

### **3.08 PROTECTION**

- A. Protect adjacent surfaces from damage by material installation.

**END OF SECTION**

**SECTION 07 92 00  
JOINT SEALANTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Nonsag gunnable joint sealants.
- B. Joint backings and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.
- B. Section 07 84 00 - Firestopping: Firestopping sealants.
- C. Section 08 71 00 - Door Hardware: Setting exterior door thresholds in sealant.
- D. Section 08 80 00 - Glazing: Glazing sealants and accessories.
- E. Section 09 21 16 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.
- F. Section 09 30 00 - Tiling: Sealant between tile and plumbing fixtures and at junctions with other materials and changes in plane.

**1.03 REFERENCE STANDARDS**

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015.
- B. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2018.
- C. ASTM C834 - Standard Specification for Latex Sealants; 2017.
- D. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2018.
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- F. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2016.
- G. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- H. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2018.
- I. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2014.
- J. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints; 2019 (Reapproved 2020).
- K. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2020.
- L. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).
- M. UL 263 - Standard for Fire Tests of Building Construction and Materials; Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.

1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
  2. List of backing materials approved for use with the specific product.
  3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
  4. Substrates the product should not be used on.
  5. Substrates for which use of primer is required.
  6. Substrates for which laboratory adhesion and/or compatibility testing is required.
  7. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
  8. Sample product warranty.
  9. Certification by manufacturer indicating that product complies with specification requirements.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.
- F. Sustainable Design Documentation: For sealants and primers, submit VOC content and emissions documentation as specified in Section 01 61 16.
- G. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.
- H. Installation Plan: Submit at least four weeks prior to start of installation.
- I. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.
- J. Field Quality Control Plan: Submit at least two weeks prior to start of installation.
- K. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.
- L. Installation Log: Submit filled out log for each length or instance of sealant installed.
- M. Field Quality Control Log: Submit filled out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.
- N. Manufacturer's Qualification Statement.
- O. Installer's Qualification Statement.

#### **1.05 QUALITY ASSURANCE**

- A. Maintain one copy of each referenced document covering installation requirements on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.
- D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.



- E. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
1. Adhesion Testing: In accordance with ASTM C794.
  2. Compatibility Testing: In accordance with ASTM C1087.
  3. Allow sufficient time for testing to avoid delaying the work.
  4. Deliver to manufacturer sufficient samples for testing.
  5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
  6. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.
- F. Installation Plan: Include schedule of sealed joints, including the following.
1. Method to be used to protect adjacent surfaces from sealant droppings and smears, with acknowledgement that some surfaces cannot be cleaned to like-new condition and therefore prevention is imperative.
  2. Approximate date of installation, for evaluation of thermal movement influence.
  3. Installation Log Form: Include the following data fields, with known information filled out.
    - a. Unique identification of each length or instance of sealant installed.
    - b. Location on project.
    - c. Substrates.
    - d. Sealant used.
    - e. Stated movement capability of sealant.
    - f. Primer to be used, or indicate as "No primer" used.
    - g. Size and actual backing material used.
    - h. Date of installation.
    - i. Name of installer.
    - j. Actual joint width; provide space to indicate maximum and minimum width.
    - k. Actual joint depth to face of backing material at centerline of joint.
    - l. Air temperature.
- G. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
1. Identification of testing agency.
  2. Name(s) of sealant manufacturers' field representatives who will be observing
  3. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
    - a. Test date.
    - b. Location on project.
    - c. Sealant used.
    - d. Date of installation of field sample to be tested.
    - e. Date of test.
    - f. Copy of test method documents.
    - g. Age of sealant upon date of testing.
    - h. Test results, modeled after the sample form in the test method document.
    - i. Indicate use of photographic record of test.
- H. Field Quality Control Plan:
1. Visual inspection of entire length of sealant joints.
  2. Field testing agency's qualifications.

3. Field Quality Control Log Form: Show same data fields as on Preinstallation Field Adhesion Test Log, with known information filled out and lines for multiple tests per sealant/substrate combinations; include visual inspection and specified field testing; allow for possibility that more tests than minimum specified may be necessary.
- I. Field Adhesion Test Procedures:
  1. Allow sealants to fully cure as recommended by manufacturer before testing.
  2. Have a copy of the test method document available during tests.
  3. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
  4. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.
- J. Field Adhesion Tests of Joints: Test for adhesion using most appropriate method in accordance with ASTM C1521, or other applicable method as recommended by manufacturer.

#### **1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

### **PART 2 PRODUCTS**

#### **2.01 JOINT SEALANT APPLICATIONS**

- A. Scope:
  1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
    - a. Wall expansion and control joints.
    - b. Joints between door, window, and other frames and adjacent construction.
    - c. Joints between different exposed materials.
    - d. Other joints indicated below.
  2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
    - a. Joints between door, window, and other frames and adjacent construction.
    - b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
      - 1) Exception: Such gaps and openings in gypsum board finished stud walls and suspended ceilings.
      - 2) Exception: Through-penetrations in sound-rated assemblies that are also fire-rated assemblies.
    - c. Other joints indicated below.
  3. Do not seal the following types of joints.
    - a. Intentional weepholes in masonry.
    - b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
    - c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
    - d. Joints where installation of sealant is specified in another section.

- e. Joints between suspended panel ceilings/grid and walls.
- B. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.
  - 1. Lap Joints in Sheet Metal Fabrications: Butyl rubber, non-curing.
- C. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
  - 1. Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.
  - 2. Wall and Ceiling Joints in Wet Areas: Non-sag polyurethane sealant for continuous liquid immersion.
  - 3. Floor Joints in Wet Areas: Non-sag polyurethane "non-traffic-grade" sealant suitable for continuous liquid immersion.
  - 4. Wall, Ceiling, and Floor Joints Where Tamper-Resistance is Required: Non-sag tamper-resistant silyl-terminated polyurethane sealant.
  - 5. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
  - 6. In Sound-Rated Assemblies: Acrylic emulsion latex sealant.
- D. Interior Wet Areas: Bathrooms, restrooms, kitchens, food service areas, and food processing areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.
- E. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".
- F. Areas Where Tamper-Resistance is Required: As indicated on drawings.

## **2.02 JOINT SEALANTS - GENERAL**

- A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.
- B. Colors: As indicated on drawings.

## **2.03 NONSAG JOINT SEALANTS**

- A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
  - 1. Movement Capability: Plus and minus 50 percent, minimum.
  - 2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
  - 3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
  - 4. Color: Match adjacent finished surfaces.
  - 5. Cure Type: Single-component, neutral moisture curing.
  - 6. Service Temperature Range: Minus 20 to 180 degrees F.
- B. Type Bathtub/Tile - Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
  - 1. Color: White.
- C. Type General Purpose Exterior - Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
  - 1. Movement Capability: Plus and minus 35 percent, minimum.
  - 2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: Match adjacent finished surfaces.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F.

- D. Polyurethane Sealant for Continuous Water Immersion: ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion; suitable for traffic exposure when recessed below traffic surface.
  - 1. Movement Capability: Plus and minus 35 percent, minimum.
  - 2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: Match adjacent finished surfaces.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F.
- E. Type General Purpose Interior Sealant - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
  - 1. Color: Standard colors matching finished surfaces.
  - 2. Grade: ASTM C834; Grade Minus 18 Degrees C (0 Degrees F).
- F. Acrylic Latex Sealant: ASTM C834; for use as acoustical sealant and in firestopping systems for expansion joints and through penetrations.
  - 1. Color: Standard colors matching finished surfaces.
  - 2. Fire Rated System: Complies with UL 263 and ASTM E119 with UL fire resistance classifications.
- G. Non-Curing Butyl Sealant: Solvent-based, single component, non-sag, non-skinning, non-hardening, non-bleeding; non-vapor-permeable; intended for fully concealed applications.

#### **2.04 ACCESSORIES**

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.
- D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
  - 1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
  - 2. Notify Architect of date and time that tests will be performed, at least seven days in advance.
  - 3. Arrange for sealant manufacturer's technical representative to be present during tests.
  - 4. Record each test on Preinstallation Adhesion Test Log as indicated.
  - 5. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.

6. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

### **3.02 PREPARATION**

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in inconspicuous area to verify that it does not stain or discolor slab.

### **3.03 INSTALLATION**

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Perform acoustical sealant application work in accordance with ASTM C919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Install bond breaker backing tape where backer rod cannot be used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

### **3.04 FIELD QUALITY CONTROL**

- A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.
- B. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

**END OF SECTION**

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**SECTION 08 11 13  
HOLLOW METAL DOORS AND FRAMES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Non-fire-rated hollow metal doors and frames.
- B. Hollow metal frames for wood doors.
- C. Fire-rated hollow metal doors and frames.
- D. Thermally insulated hollow metal doors with frames.
- E. Hollow metal borrowed lites glazing frames.
- F. Accessories, including glazing, louvers, and matching panels.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 71 00 - Door Hardware.
- B. Section 08 80 00 - Glazing: Glass for doors and borrowed lites.

**1.03 ABBREVIATIONS AND ACRONYMS**

- A. ANSI: American National Standards Institute.
- B. ASCE: American Society of Civil Engineers.
- C. HMMA: Hollow Metal Manufacturers Association.
- D. NAAMM: National Association of Architectural Metal Manufacturers.
- E. NFPA: National Fire Protection Association.
- F. SCIF: Sensitive Compartmented Information Facility.
- G. SDI: Steel Door Institute.
- H. UL: Underwriters Laboratories.

**1.04 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames; 2007 (Reaffirmed 2011).
- C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2017.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2020.
- H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.

- I. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2020.
- J. ASTM C476 - Standard Specification for Grout for Masonry; 2020.
- K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.
- L. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.
- M. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- N. ITS (DIR) - Directory of Listed Products; current edition.
- O. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- P. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- Q. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2007.
- R. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- S. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.
- T. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2017.
- U. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.
- V. UL (DIR) - Online Certifications Directory; Current Edition.
- W. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- D. Samples: Submit two samples of metal, 2 by 2 inches in size, showing factory finishes, colors, and surface texture.
- E. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- F. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.
- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.



- C. Maintain at project site copies of reference standards relating to installation of products specified.

### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Hollow Metal Doors and Frames:
  - 1. Ceco Door, an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  - 2. Curries, an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  - 3. Republic Doors, an Allegion brand: [www.republicdoor.com/#sle](http://www.republicdoor.com/#sle).
  - 4. Steelcraft, an Allegion brand: [www.allegion.com/#sle](http://www.allegion.com/#sle).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 PERFORMANCE REQUIREMENTS**

- A. Requirements for Hollow Metal Doors and Frames:
  - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
  - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
  - 3. Door Top Closures: Flush end closure channel, with top and door faces aligned.
  - 4. Door Edge Profile: Beveled, both sides.
  - 5. Typical Door Face Sheets: Flush.
  - 6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturers standard.
  - 7. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

### **2.03 HOLLOW METAL DOORS**

- A. Door Finish: Factory finished.
- B. Exterior Doors: Thermally insulated.
  - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 3 - Extra Heavy-duty.
    - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 2 - Seamless.
    - d. Door Face Metal Thickness: 16 gauge, 0.053 inch, minimum.

2. Door Core Material: Polyurethane, 1.8 lbs/cu ft minimum density.
    - a. Foam Plastic Insulation: Manufacturer's standard board insulation with maximum flame spread index (FSI) of 75, and maximum smoke developed index (SDI) of 450 in accordance with ASTM E84, and completely enclosed within interior of door.
  3. Door Thermal Resistance: R-Value of 8.7, minimum, for installed thickness of polyurethane.
  4. Door Thickness: 1-3/4 inches, nominal.
  5. Weatherstripping: Refer to Section 08 71 00.
- C. Interior Doors, Non-Fire-Rated:
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level {CH#47669}.
    - b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 20 gauge, 0.032 inch, minimum.
  2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
  3. Door Thickness: 1-3/4 inches, nominal.
- D. Fire-Rated Doors:
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 2 - Heavy-duty.
    - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 18 gauge, 0.042 inch, minimum.
  2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
  3. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction.
  4. Provide units listed and labeled by UL (DIR) or ITS (DIR).
    - a. Attach fire rating label to each fire rated unit.
  5. Door Thickness: 1-3/4 inches, nominal.

#### **2.04 HOLLOW METAL FRAMES**

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Same as hollow metal door.
- C. Exterior Door Frames: Face welded type.
  1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
  2. Weatherstripping: Separate, see Section 08 71 00.
- D. Interior Door Frames, Non-Fire Rated: Face welded type.
  1. Terminated Stops: Provide at interior doors; closed end stop terminated 6 inch, maximum, above floor at 45 degree angle.
- E. Door Frames, Fire-Rated: Face welded type.
  1. Fire Rating: Same as door, labeled.
- F. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

- G. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.

## **2.05 FINISHES**

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Factory Finish: Complying with ANSI/SDI A250.3, manufacturer's standard coating.
1. Color: As selected by Architect from manufacturer's standard range.
- C. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15 mil, 0.015 inch dry film thickness (DFT) per coat; provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
1. Fire-Rated Frames: Comply with fire rating requirements indicated.

## **2.06 ACCESSORIES**

- A. Glazing: As specified in Section 08 80 00, factory installed.
- B. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.
- C. Astragals for Double Doors:
1. Exterior Doors: Steel, Z-shaped.
  2. Fire-Rated Doors: Steel, shape as required for fire rating.
- D. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
- E. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- F. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

### **3.02 PREPARATION**

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

### **3.03 INSTALLATION**

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Install prefinished frames after painting and wall finishes are complete.
- C. Install fire rated units in accordance with NFPA 80.
- D. Coordinate frame anchor placement with wall construction.
- E. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- F. Install door hardware as specified in Section 08 71 00.

- G. Comply with glazing installation requirements of Section 08 80 00.
- H. Coordinate installation of electrical connections to electrical hardware items.
- I. Touch up damaged factory finishes.

**3.04 TOLERANCES**

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

**3.05 ADJUSTING**

- A. Adjust for smooth and balanced door movement.

**END OF SECTION**

**SECTION 08 14 16  
FLUSH WOOD DOORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Flush wood doors; flush and flush glazed configuration; fire-rated and non-rated.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 12 13 - Hollow Metal Frames.
- B. Section 08 71 00 - Door Hardware.
- C. Section 08 80 00 - Glazing.

**1.03 REFERENCE STANDARDS**

- A. AWI/AWMAC/MI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2018).
- B. AWMAC/MI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2017, with Errata (2019).
- C. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
  - 1. Provide information as required by AWI/AWMAC/MI (AWS) or AWMAC/MI (NAAWS).
- D. Samples: Submit two samples of door construction, cut from top corner of door
- E. Samples: Submit two samples of door veneer, illustrating wood grain, stain color, and sheen.
- F. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- G. Manufacturer's Installation Instructions: Indicate special installation instructions.
- H. Manufacturer's Qualification Statement.
- I. Installer's Qualification Statement.
- J. Warranty, executed in Owner's name.

**1.05 QUALITY ASSURANCE**

- A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.
  - 1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.
- D. Quality Certification:

1. Provide labels or certificates indicating that installed work will comply with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
2. Provide designated labels on shop drawings as required by certification program.
3. Provide designated labels on installed products as required by certification program.
4. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging, and inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

#### **1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Wood Veneer Faced Doors:
  1. Haley Brothers: [www.haleybros.com/#sle](http://www.haleybros.com/#sle).
  2. Masonite Architectural: [www.architectural.masonite.com/#sle](http://www.architectural.masonite.com/#sle).
  3. Oregon Door: [www.oregondoor.com/#sle](http://www.oregondoor.com/#sle).
  4. VT Industries, Inc: [www.vtindustries.com/#sle](http://www.vtindustries.com/#sle).
  5. Substitutions: See Section 01 60 00 - Product Requirements.

#### **2.02 DOORS**

- A. Doors: See drawings for locations and additional requirements.
  1. Quality Standard: Custom Grade, Standard Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
  2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
  1. Provide solid core doors at each location.
  2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
  3. Smoke and Draft Control Doors (Indicated as "S" on Drawings): In addition to required fire rating, provide door assemblies tested in accordance with UL 1784 with maximum air leakage of 3.0 cfm per sq ft of door opening at 0.10 inch wg pressure at both ambient and elevated temperatures for "S" label; if necessary, provide additional gasketing or edge sealing.
  4. Wood veneer facing with factory transparent finish as indicated on drawings.

### 2.03 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

### 2.04 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: White birch, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
  - 1. Vertical Edges: Same species as face veneer.
  - 2. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet of each other when doors are closed.
- B. Veneer Facing for Opaque Finish: Medium density overlay (MDO), in compliance with indicated quality standard.

### 2.05 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
  - 1. Provide solid blocks at lock edge for hardware reinforcement.
  - 2. Provide solid blocking for other throughbolted hardware.
- C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
  - 1. Exception: Doors to be field finished.
- E. Provide edge clearances in accordance with the quality standard specified.

### 2.06 FINISHES - WOOD VENEER DOORS

- A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
- B. Factory finish doors in accordance with approved sample.
- C. Seal door top edge with color sealer to match door facing.

### 2.07 ACCESSORIES

- A. Hollow Metal Door Frames: See Section 08 11 13.
- B. Glazing: See Section 08 80 00.
- C. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.
- D. Door Hardware: See Section 08 71 00.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.

- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

### **3.02 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
  - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Coordinate installation of glazing.

### **3.03 TOLERANCES**

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

### **3.04 ADJUSTING**

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

**END OF SECTION**



**SECTION 08 31 00  
ACCESS DOORS AND PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wall and ceiling mounted access units.

**1.02 REFERENCE STANDARDS**

- A. ITS (DIR) - Directory of Listed Products; current edition.
- B. UL (FRD) - Fire Resistance Directory; Current Edition.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Shop Drawings: Indicate exact position of each access door and/or panel unit.
- D. Manufacturer's Installation Instructions: Indicate installation requirements.
- E. Project Record Documents: Record actual locations of each access unit.

**PART 2 PRODUCTS**

**2.01 ACCESS DOORS AND PANELS ASSEMBLIES**

- A. Wall-Mounted Units:
  - 1. Location: As indicated on drawings.
  - 2. Panel Material: Steel.
  - 3. Size: As Required.
  - 4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
  - 5. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
- B. Wall-Mounted Units in Wet Areas:
  - 1. Location: As indicated on drawings.
  - 2. Panel Material: Steel, hot-dipped zinc, or zinc-aluminum-alloy coated.
  - 3. Size: As Required.
  - 4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
  - 5. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
- C. Fire-Rated Wall-Mounted Units:
  - 1. Location: As indicated on drawings.
  - 2. Wall Fire-Rating: As indicated on drawings.
  - 3. Panel Material: Steel.
  - 4. Size: As Required.
  - 5. Door/Panel: Insulated double-surface panel, with tool-operated spring or cam lock and no handle.
- D. Ceiling-Mounted Units:
  - 1. Location: As indicated on drawings.
  - 2. Panel Material: Steel.
  - 3. Size - Lay-In Grid Ceilings: To match module of ceiling grid.
  - 4. Size - Other Ceilings: As Required.

5. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
- E. Fire-Rated Ceiling-Mounted Units:
  1. Location: As indicated on drawings.
  2. Ceiling Fire-Rating: As indicated on drawings.
  3. Panel Material: Steel.
  4. Size: As Required.
  5. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.

## **2.02 WALL AND CEILING MOUNTED ACCESS UNITS**

- A. Manufacturers:
  1. Activar Construction Products Group, Inc. - JL Industries: [www.activarcpg.com/#sle](http://www.activarcpg.com/#sle).
  2. ACUDOR Products Inc: [www.acudor.com/#sle](http://www.acudor.com/#sle).
  3. Babcock-Davis: [www.babcockdavis.com/#sle](http://www.babcockdavis.com/#sle).
  4. Karp Associates, Inc: [www.karpinc.com/#sle](http://www.karpinc.com/#sle).
  5. Milcor, Inc: [www.milcorinc.com/#sle](http://www.milcorinc.com/#sle).
  6. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Wall and Ceiling Mounted Units: Factory fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.
  1. Style: As indicated on drawings.
  2. Door Style: Single thickness with rolled or turned in edges.
  3. Frames: 16 gauge, 0.0598 inch, minimum thickness.
  4. Double-Skinned Hollow Steel Sheet Door Panels: 16 gauge, 0.059 inch, minimum thickness, on both sides and along each edge.
  5. Insulation: Non-combustible mineral wool or glass fiber.
  6. Units in Fire-Rated Assemblies: Fire rating as required by applicable code for fire-rated assembly that access doors are being installed.
    - a. Provide products listed by ITS (DIR) or UL (FRD) as suitable for purpose indicated.
    - b. Provide certificate of compliance from authorities having jurisdiction indicating approval of fire rated doors.
  7. Hardware:
    - a. Hardware for Fire-Rated Units: As required for listing.
    - b. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
    - c. Handle: Fixed.
    - d. Latch/Lock: Screw driver slot for quarter turn cam latch.
    - e. Number of Locks/Latches Required: As recommended by manufacturer for size of unit.
    - f. Inside Latch Release: Mechanism that allows door/panel to be opened from inside.
    - g. Gasketing: Extruded neoprene, around perimeter of door panel.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that rough openings are correctly sized and located.
- B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to proceeding with this work.

- B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

**3.03 INSTALLATION**

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.

**END OF SECTION**

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**SECTION 08 34 90  
TORNADO-RESISTANT ASSEMBLIES**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section includes:
1. Steel Tornado Doors
  2. Steel Tornado Frames
- B. Exclusions: Metal for the following is not provided under the scope of this section:
1. Structural steel
  2. Headers and lintels
  3. Framing
  4. Steel channel frames
  5. Access panels
- C. Related Sections:
1. Division 01 Section "Alternates" for alternates affecting the work of this section.
  2. Division 03 Section "Precast Structural Concrete"
  3. Division 04 Section "Unit Masonry"
  4. Division 07 Section "Joint Sealants"
  5. Division 08 Section "Steel Doors and Frames"
  6. Division 08 Section "Door Hardware"
  7. Division 08 Section "Glass and Glazing"
  8. Division 09 Sections for touchup finishing or refinishing of existing openings modified by the work of this section.
  9. Division 26 Sections for connections to electrical power system and for low-voltage wiring work.
  10. Division 28 Sections for coordination with other components of other components of electronic access control system.

**1.03 REFERENCES**

- A. Tornado Resistant Assemblies
1. IBC – International Building Code
    - a. 2015 Edition, Section 423 – Building types or functions and geographic locations to be built with a storm shelter
  2. ICC/NSSA - International Code Council / National Storm Shelter Association
    - a. ICC 500-2014 Standard for the Design and Construction of Storm Shelters
    - b. Highlights of ICC 500-2014
  3. FEMA – Federal Emergency Management Agency
    - a. FEMA P-361, Third Edition / March 2015 – Safe Rooms for Tornadoes and Hurricanes: Guidance for Community and Residential Safe Rooms
    - b. FEMA P-320, December 2014 – Taking Shelter from the Storm: Building a Safe Room for Your Home or Small Business
- B. Fire/Life Safety

1. NFPA - National Fire Protection Association
  - a. NFPA 70 – National Electric Code
  - b. NFPA 80 - Standard for Fire Doors and Fire Windows
  - c. NFPA 101 - Life Safety Code
  - d. NFPA 105 - Smoke and Draft Control Door Assemblies
2. State Fire Safety Code.
- C. UL - Underwriters Laboratories
  1. UL 10C - Positive Pressure Test of Fire Door Assemblies
  2. UL 1784 - Air Leakage Tests of Door Assemblies
- D. Accessibility
  1. ADA - Americans with Disabilities Act .
  2. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
    - a. SDI – Steel Door Institute
  3. SDI SDI 100/ANSI A250.8 - Recommended Specifications - Standard Steel Doors and Frames.
    - a. SDI Certified <https://www.steeldoor.org/sdicerified.php>
  4. SDI 105 - Recommended Erection Instructions for Steel frames.
  5. SDI 111 - Recommended Details and Guidelines for Standard Steel Doors and Frames and Accessories.
  6. SDI 112 - Zinc-Coated (Galvanized/Galvannealed) Standard Steel Doors and Frames.
  7. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames.
  8. SDI 118 - Basic Fire Door Requirements.
  9. SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
  10. SDI 124 - Maintenance of Standard Steel Doors and Frames.
- E. DHI - Door and Hardware Institute
  1. Sequence and Format for the Hardware Schedule.
  2. Recommended Locations for Builders Hardware.
  3. ANSI/DHI A115.IG - Installation Guide for Doors and Hardware.
- F. ANSI - American National Standards Institute (refers to most current versions of standards)
  1. ANSI/DHI A115.IG - Installation Guide for Doors and Hardware.
  2. ANSI/BHMA A156.1 - A156.29, and ANSI A156.31 - Standards for Hardware and Specialties
  3. ANSI A250.3 - Test Procedure and Acceptance Criteria for - Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames.
  4. ANSI A250.4 - Test Procedure and Acceptance Criteria for - Physical Endurance for Steel Doors, Frames, Frame Anchors, and Hardware Reinforcings. Product is tested and provided as Level "A", 1,000,000 cycle test criteria and other requirements as listed in these specifications.
  5. ANSI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
  6. ANSI/SDI A250.8/SDI-100 Recommended Specifications for Standard Steel Doors and Frames.
  7. ANSI A250.10 - Test Procedures and Acceptance Criteria for – Prime Painted Steel Surfaces for Steel Doors and Frames.
  8. ANSI A250.11 - Recommended Erection Instructions for Steel Frames.
- G. NAAMM - National Association of Architectural Metal Manufacturers

1. NAAMM/HMMA-840 - Guide Specification for Installation and Storage of Hollow Metal Doors and Frames.

#### 1.04 SUBMITTALS

A. General:

1. Submit the following in accordance with conditions of contract and Division 01 requirements.
2. Advise Architect within the submittal package of incompatibility or issues which may detrimentally affect the work of this section.
3. Provide tornado-resistant opening systems: Provide approved door, frame, hardware and accessory assemblies, complying with guidance from FEMA 361 and approved under ICC 500-2014 Test Standard for the Design and Construction of Storm Shelters by a certified lab and labeling facility such as Intertek or UL.
4. System Description / Requirements to be submitted:
  - a. Requirements for tornado-resistant assemblies per ICC 500-2014:
    - 1) Single and pair door assemblies including doors, frames, hardware and accessories, shall be labeled by a nationally recognized independent third party testing laboratory / listing agency such as Intertek (ITS) / Warnock Hershey (WHI) or Underwriter's Laboratories (UL). Labels shall be visible on both frames and door edges. Doors, frames, hardware and accessories shall be publically listed and accessible.
    - 2) Tests for doors, windows, and impact-protective systems shall be performed on maximum and minimum sizes listed for use
    - 3) Assembly static test pressure shall to be 1.2 times the design wind pressure for listed assemblies. The minimum test pressure shall be 252 PSF based on a 302 PSF minimum design pressure required by ICC 500-2014 in order to withstand 250 MPH wind speeds in figure 304.2(1).
    - 4) Door assemblies shall withstand impacts to areas defined by section 804.9.5 of ICC 500-2014 where a 15lb 2x4 impacts specified locations at a minimum speed of 100 MPH.
    - 5) According to the ICC 500-2014, anchor information, along with additional details made available from the contractor or architect communicating wall cladding and wall cladding connections, foundation design and capacity, and shelter methods, are needed for peer reviewers and AHJ's to verify that a proper load path exists for doors, windows and shutters, to withstand 250 MPH wind zones and possible extreme forces that this tornado shelter was designed to withstand for life safety. (Refer to ICC 500-2014 Highlights public document for specific guidance in directing attention to the ICC 500-2014 standards.)
    - 6) Public approval listing including anchor calculations from a third party PE based on accepted engineering practice shall be made available upon request. Per ICC 500-2014, Sections 301.1.2, 306.6, and 107.3.2, to ensure a proper load path for doors and shutters, where frame anchorage for openings of entry/egress of a shelter is required by means other than those provided in the manufacturer's listing or installation instructions in accordance with Section 107, alternate anchorage shall be designed for pull-out and shear and the anchorage placement shall be provided in accordance with accepted engineering practice. Anchor with bolt quantity and placement for the chosen opening size and wall construction shall be provided, including the following details.
      - (a) Third party licensed PE signed Report number identifying anchorage details with calculations.

- (b) Wall construction.
  - (c) Required load per anchor.
  - (d) Anchor bolt specification including (1) size and (2) pull-out / shear values, (3) required embedment, and (4) minimum edge distance from center of anchor to wall edge.
  - (e) Anchor bolt quantity and locations / spacing per opening.
  - (f) Installation instructions.
- 7) Fire rated door opening assemblies must comply with UL10C, Positive Pressure Fire Test of Door Assemblies
- B. Action Submittals:
- 1. Product Data: Provide illustrations from manufacturer's catalogs and data in brochure form for all products, including model, function, reinforcements, anchoring, design, finish, and options.
  - 2. Door and Hardware Schedule: Organize schedule into spreadsheet format indicating complete designations of every item required for each door and frame. Door and hardware schedule shall clearly indicate architect's door number, elevations, and notes.
  - 3. Shop Drawings: Drawings of openings aligning with the Door, frame, and hardware schedule in accordance with SDI 111D. Show types, quantities, dimensions, specified performance, design criteria, materials and similar data for each opening required.
    - a. Indicate frame configuration, anchor types and spacing, location of cutouts for hardware, reinforcement, to ensure doors and frames are properly prepared and coordinated to receive specified hardware.
    - b. Indicate all door elevations, internal reinforcements and closure methods.
    - c. Indicate all hardware and accessories.
  - 4. Templates: After final approval of the door and hardware schedule, provide listing of manufacturer's hardware locations for each item of hardware.
- C. Informational Submittals:
- 1. Qualification Data: For manufacturer, supplier, installer and Certified Door Consultant.
    - a. Supplier: A direct account of the manufacturer who has on permanent staff, an Architectural Hardware Consultant (AHC), a Certified Door Consultant (CDC) or an Architectural Openings Consultant (AOC), who will be available to consult with the Architect and Contractor regarding matters affecting the door and frame openings.
  - 2. Product Certificates and Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by the manufacturer and witnessed by a qualified, accredited testing agency for doors and frames located in accessible routes.
    - a. Evidence of manufacturer as "SDI Certified" from the Steel Door Institute.
    - b. Manufacturer evidence of compliance with standards shown in 1.03 "References" section of this document.
    - c. Listing Report number from an accredited testing and labeling facility (Intertek / UL) for the AHJ's reference to the tornado approval. Listing Report shall communicate design wind pressure and missile impact tests in accordance with FEMA 361 / ICC 500-2014 requirements
    - d. Report with calculations of anchoring requirements including locations and minimum required capacity from a third party PE based on accepted engineering practice shall be made available upon request.
    - e. Certificate or signed letter stating 5 years minimum experience installing labeled tornado products



- f. Certificates of compliance and installation instructions shall be made available upon request of Architect or authority having jurisdiction.
- 3. Warranty: As specified in this section pertaining to manufacturer, supplier and installer.
- D. Closeout Submittals:
  - 1. Operations and Maintenance Data : Provide in accordance with Division 01 and include the following:
    - a. Complete information on care, maintenance, and adjustment; data on repair and replacement.
    - b. Catalog pages for each product.
    - c. Name, address, and phone number of local representative for each manufacturer.
    - d. Copy of final approved door and frame schedule, edited to reflect conditions as-installed.
    - e. Copy of warranties including appropriate reference numbers for manufacturers to identify the project.

### 1.05 QUALITY ASSURANCE

- A. Product Substitutions: For the purpose of performing the work of this section, comply with product requirements stated in Division 01 and as specified herein.
  - 1. Where a specific manufacturer's product is named and accompanied by the words "No Substitute," including make or model number or other designation, provide the product exactly as specified. (Note: Certain products have been selected for their unique characteristics and particular project suitability.)
    - a. Where no additional products or manufacturers are listed in a product category, requirements for "No Substitute" govern product selection.
  - 2. Where products indicate "acceptable substitute" or "acceptable manufacturer", provide product from specified manufacturers, subject to compliance with specified requirements and "Single Source Responsibility" requirements stated herein.
- B. Supplier Qualifications and Responsibilities: A direct account of the manufacturer. A recognized hollow metal door and frame supplier of tornado-resistant approved systems, with warehousing facilities in the project's vicinity, that has a record of successful in-service performance for supplying hollow metal doors and frames similar in quantity, type, and quality to that indicated for this project and that provides a Certified Door Consultant (CDC) available to the Owner, Architect, and Contractor, at reasonable times during the course of the work for consultation.
  - 1. Warehousing Facilities: In project's vicinity.
  - 2. Scheduling Responsibility: Preparation of hollow metal door and frame schedules.
  - 3. Engineering Responsibility: Preparation of data for field spliced or field modified units, including shop drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this project.
  - 4. Coordination Responsibility: Coordinate preparation of the door hardware and provide installation and technical data to the Architect and other related subcontractors.
    - a. Upon completion of hollow metal door and frame installation, inspect and verify that all components are working properly.
- C. Manufacturer: Member of Steel Door Institute and is SDI Certified, with specialized capabilities manufacturing tornado-resistant opening systems complying with ICC 500-2014 and FEMA 361, and provides labeled doors and frames from a qualified, accredited testing agency, including hardware and accessories as specified in this section with minimum five years documented experience manufacturing tornado labeled systems.

1. Manufacturer Installation Instructions: Contractor shall maintain a current copy of tornado shelter storm door, frame and hardware manufacturer published installation instructions and FEMA 361/ICC 500-2014 requirements in Project Field Office and refer to installation instructions at all times during installation.
  2. Tornado-Resistant Openings Systems: Provide complete door systems for tornado-resistant storm shelters and other areas of refuge complying and tested according to FEMA 361, Second Edition (2008), Design and Construction Guidance for Community Safe Rooms; and ICC 500 (2014), ICC/NSSA Standard for the Design and Construction of Storm Shelters.
  3. Label tornado-resistant doors and frames with permanently affixed metal labels (non-Mylar) to clearly denote compliance with FEMA 361 and ICC 500-2014.
    - a. Each door and frame will have its own permanent label showing what criteria the door and frame was tested in accordance with. The label will show what independent laboratory tested this assembly. The label will show test pressures both positive and negative in pounds per square foot and the design pressure both positive and negative.
    - b. Doors with glass shall be etched or similarly labeled
  4. Single source for all door hardware is required. Door Hardware and Accessories that are supplied under sections 08 39 06, 08 71 00, and 28 13 00 can be supplied under separate contracts but must all originate from the same manufacturer. No exceptions.
- D. Installer Qualifications: Qualified tradesmen, skilled in the application of tornado hollow metal doors and frames that has a record of successful in-service performance for installing hollow metal doors and frames similar in quantity, type, and quality to that indicated for this project.
- E. Certified Door Consultant Qualifications: A person who is experienced in providing consulting services for commercial tornado door systems that are comparable in material, design, and extent to that indicated for this project and who can meet the following qualification requirements:
1. For door hardware, DHI-certified, Certified Door Consultant (CDC).
  2. Can provide installation and technical data to the Architect and other related subcontractors.
  3. Can inspect and verify components are in working order upon completion of installation.
- F. Single Source Responsibility: Obtain each type of hollow metal door and frame from a single manufacturer.
- G. Fire-Rated Openings: Provide doors and frames for fire-rated openings that complies with NFPA Standard No. 80, UL10C, Category "A", Positive Pressure Test of Fire Door Assemblies, and requirements of authorities having jurisdiction. Provide only doors and frames that are labeled and listed for ratings indicated by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to the authority having jurisdiction.
1. Affix a physical label or approved marking to each fire door or fire door frame, at an authorized facility as evidence of compliance with procedures of the labeling agency. Label embossment is not permitted.
  2. Conform to applicable codes for fire ratings. It is the intent of this specification that hardware and its application comply or exceed the standards for labeled openings. In case of conflict between types required for fire protection, furnish type required by NFPA and UL.
  3. Fire door assemblies in exit enclosures and exit passageways; maximum transmitted temperature end point rating of not more than 250 degrees F (121 degrees C) above ambient at the end of 30 minutes of the standard fire test exposure.

- H. Refer to Division 1 Section "Special Conditions" for additional information and minimum experience requirements.
- I. Substitutions: Request for substitutions of items of Tornado-Resistant Openings Systems (doors, frames, hardware and accessories) other than those listed as "acceptable and approved" shall be made to the architect in writing no later than 10 days prior to bid opening. Approval of substitutions will only be given in writing or by Addenda. Requests for substitutions shall be accompanied by samples and/or detailed information for each manufacturer of each product showing design, functions, material thickness and any other pertinent information needed to compare product with that specified. Lack of this information will result in a refusal. Refer to Division 01 for additional information regarding substitutions and submittals.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Tag each item or package separately with identification related to the final door and frame schedule, and include installation instructions with each delivery.
  - B. Comply with manufacturer's current written instructions and recommendations.
  - C. Deliver doors in manufacturer's standard labeled protective packaging.
  - D. Accept products on site in manufacturer's packaging. Inspect for damage. Return damaged Products and replace with undamaged products.
  - E. Project field superintendent shall inspect products immediately upon delivery to project site, determine Product conformance with specified requirements and reject Products not complying with specifications. Project field superintendent shall direct that non-complying products be removed from project site immediately.
  - F. Handle, store and protect products in accordance with the manufacturers printed instructions and ANSI/SDI A250.10 and NAAMM/HMMA 840.
  - G. Project Conditions:
    - 1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
      - a. Door Storage: Store doors in upright position, under cover. Place doors on at least 4 inch high wood sills or on floors in manner that will prevent rust and damage. Do not use non-vented plastic or canvas shelters which create humidity chamber and promote rusting. If corrugated wrapper on door becomes wet, or moisture appears, remove all packaging immediately. Provide 1/4 inch (6.3) space between doors to promote air circulation.
      - b. Frame Storage: Store frames under cover on 4 inch wood sills on floors in manner that will prevent rust and damage. Do not use non-vented plastic or canvas shelters which create humidity chamber and promote rusting. Should wrappers become wet, remove immediately. Store assembled frames in vertical position, 5 units maximum in stack. Provide 1/4 inch space between frames to promote air circulation. Store frames in an upright position with heads uppermost under cover. Place on 4 inch (102 mm) high wood sills to prevent rust and damage. Store assembled frames five units maximum in a stack with 2 inch (51 mm) space between frames to promote air circulation.
  - H. Protection and Damage:
    - 1. Promptly replace products damaged during shipping with exactly the same products.
    - 2. Handle doors and frames in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during the course of the Work.
-

3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- I. Refer to Division 01 Sections "Summary of Work" and "Special Conditions" for additional information and requirements regarding stored materials.

#### **1.07 COORDINATION**

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete. See Division 03 for concrete, reinforcement, and formwork requirements, and Division 04 2000 "Unit Masonry".
- B. Coordinate work with frame opening construction, door and hardware installation. Coordinate work with Section 08 11 00 Steel Doors and Frames, Section 08 71 00 Finish Hardware, and other directly affected sections involving manufacture or fabrication of internal cutouts and reinforcement for door hardware, electric devices and recessed items.
- C. Verify field dimensions for factory assembled frames prior to fabrication.
- D. Installation: Sequence installation to accommodate required door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing doors and frames to comply with indicated requirements.
- E. Electrical System Roughing-In: Coordinate layout and installation of doors and frames with electrified door hardware connections.

#### **1.08 WARRANTY**

- A. Provide manufacturer's warranties as specified in Division 01 and as follows:
  1. Hollow Metal Doors and Frames: 1 year.
  2. Warranty does not cover damage or faulty operation due to improper installation, improper use, or abuse.

#### **1.09 MAINTENANCE**

- A. Maintenance Instructions: Furnish a complete set of maintenance instructions as needed for Owner's continued maintenance of doors and frames.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.
- B. Tornado-resistant assemblies shall be provided by a single source manufacture.
- C. Provide all steel doors and frames from a single manufacturer who is SDI Certified, identifying a distinguished group of companies that are regularly audited to ensure they meet SDI's rigorous manufacturing, performance and quality standards for the Hollow Metal Industry.
- D. Basis of Design Manufacture: Steelcraft, Paladin Series PW doors and FP frames.
- E. General: Tornado-resistant door and frame assemblies must be specifically designed, tested and approved, in compliance with the Federal Emergency Management Agency (FEMA) 361 guidelines and ANSI ICC 500-2014 – Standard for the Design and Construction of Storm Shelters. For compliance with the standards, the steel door, steel frame and hardware must be supplied as a system.

## 2.02 MATERIALS

- A. Interior and Exterior Galvannealed Face Sheets and reinforcements: 14 Gage A60 Galvannealed Steel for Superior strength and corrosion resistance on exterior openings, per ASTM-A653.
- B. Fasteners
  - 1. Provide fastenings, anchors and clips as required to secure hollow metal work in place. Provide manufacturers standard screws. Dimple metal work to receive screw heads. Set stops and other non-structural fastenings with manufacturer's standard self-tapping screws.

## 2.03 STEEL FRAMES – BASIS OF DESIGN - PALADIN FP14 SERIES FRAMES

- A. Manufacturer:
  - 1. Scheduled Manufacturer: Steelcraft
  - 2. Substitutions: See Section 01 60 00-Product Requirements.
- B. Provide 14 Gauge A60 galvannealed steel.
- C. Provide tornado-resistant hollow metal frames as scheduled, and drawn and detailed on plans, with the provisions below.
- D. Provided die-mitered corner connections to ensure tight/closed miters at head and jambs.
- E. Factory prep: Welded.
- F. Provide patented universal hinge preparations.
- G. Provide beveled hinge and strike edges.
- H. Provide 7 gauge hinge reinforcement. Provide 14 gauge full length reinforcement for continuous hinges.
- I. Provide 12 gauge head reinforcement.
- J. Provide 12 gauge steel center strike reinforcement with 14 gauge head/sill strike reinforcement.
- K. Provide adjustable base anchors to allow for adjustment in installation when the floor is not level.
- L. Provide factory applied baked-on rust-inhibiting primer.
- M. When supported by the proper signed, third party PE reports calculating approved anchoring, provide frames anchored with or without grout fill. When using 4" face, provide frames grouted full utilizing proper grout fill protocols per SDI/ANSI 250.8.
- N. Provide 14 gauge steel closer reinforcements when specified.
- O. Opening sizes: Shall not exceed the smallest and largest sizes tested and approved per ICC 500-2014. Available sizes shall be publically available on Intertek or UL listing websites.
- P. Fire Rating: Where called for by the door and hardware schedules, tornado-resistant doors, frames, shutter, and glass lights shall be identified by an official metal label or etching (for glass) to signify tested approval from ITS – Warnock Hersey or Underwriters' Laboratories, to UL 10C protocols.

## 2.04 STEEL FRAMES – ANCHORING

- A. Provide hollow metal frames as scheduled, and drawn and detailed on plans, with the provisions below.

- B. Approved frame anchors and any necessary anchor bolts certified by third party PE reports shall be provided from the factory based on the specific wall condition. Most common wall conditions are concrete walls (tilt-up/pre-fab/poured in place) or concrete-filled CMU block walls.
- C. Provide installation instructions.
- D. Provide anchoring approved by UL or Intertek Testing Services / Warnock Hershey (ITS/WHI), supported by testing and third party PE reports.
- E. Grout new masonry frames full.
- F. Provide frames to be used in existing masonry with tube and strap anchors welded from the factory.

#### **2.05 STEEL DOORS – BASIS OF DESIGN - PALADIN PW14 SERIES DOORS**

- A. Provide tornado-resistant hollow metal doors as scheduled, and drawn and detailed on plans, with the provisions below.
- B. Corrosion-resistant steel construction: Provide standard A-60 galvanized steel for resistance against corrosion on exterior openings.
- C. Steel stiffened core construction: Provide stiffeners welded to one face sheet and attached with epoxy to the opposite face sheet
- D. Seamless, full height, mechanical interlock edges: Provide lock and hinge edges welded and filled smooth for structural support and stability the full height of the door
- E. Provide continuous 12 gage steel channel (projection welded) at lock rails.
- F. Full height lock side reinforcement channel.
- G. Provide 12 gage top channel and 14 gage bottom channel steel reinforcement.
- H. Provide doors with beveled hinge and lock edges.
- I. Provide universal hinge preparations.
- J. Provide 7 gage hinge reinforcements.
- K. Provide 14 gage closer reinforcements.
- L. Provide factory applied baked-on rust-inhibiting primer in accordance with ANSI A250-10, with finish paint options available.
- M. Provide 14 gage galvanized steel face skins.
- N. Provide 1-3/4 inch thick doors.
- O. Opening sizes shall not exceed the smallest and largest sizes tested and approved per ICC 500-2014. Available sizes shall be publically available on Intertek or UL listing websites.
- P. Size Availability (3-sided flush and glazed): Single 3'-0" x 6'-8" thru 4'-0" x 8'-0"; Pair 6'-0" x 6'-8" thru 8'-0" x 8'-0".
- Q. Provide handed doors and frames.
- R. Provide doors built with 3/32" gaps at each jamb and 1/8" gap at the head.
- S. Custom door undercuts shall be made available, provided they meet with the labelling agencies requirements.
- T. Follow installation instructions provided by the manufacturer. The manufacturer's strike must be used. Bottom strikes must be anchored or grouted into the foundation slab.

## 2.06 FINISHES

- A. Chemical Treatment: Treat steel surfaces to promote proper paint adhesion per ANSI/SDI A250.3, Test Procedure and Acceptance Criteria for Factory Applied Finished Painted Steel Surfaces for Steel Doors and Frames.
- B. Factory Prime Finish: Meet requirements of ANSI A 250.10., Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

## 2.07 TORNADO-RESISTANT DOOR HARDWARE AND ACCESSORIES

- A. Provide approved hardware and accessories as part of the complete prescriptive door assembly opening by Intertek or UL public listing for the labeled tornado-resistant assembly, communicating compliance with FEMA 361 guidelines and ICC 500-2014 standards.

## 2.08 FABRICATION

- A. Fabricate doors and frames in accordance with requirements of ANSI A250.8-2003/SDI 100.
- B. Fabricate fire rated doors and frames in accordance with requirements of ITS – Warnock Hersey or Underwriters' Laboratories, with metal label on each door and frame signifying UL-10C compliance.
- C. Typical Frame Reinforcing: Provide steel reinforcement as required for hardware items per manufacturers templates. Provide minimum hinge reinforcement 7 gage by 1-1/2 inch by 9 inch and lock strike reinforcement 16 gage 1 inch by 1-1/2 inch by 4 inch long. Provide similar reinforcement for hardware items as required to adequately withstand stresses, minimum 14 gage, including channel reinforcement for door closers and closer arms, door holders and similar items. Provide reinforcement and clearances for concealed in-head door closers and mortised locks. Reinforcing as provided for in ANSI-A250.6.
- D. Mortar Guards in Frames: For hinge and strike plate cutouts, provide fully enclosed pressed steel cover boxes spot welded to frames behind mortises. Additionally, for frames in masonry walls and frames being grout filled, provide metal mortar guards for any mortised cutouts.
- E. Hardware Preparation at Frames: Mortise, reinforce, drill and tap as required for all mortised hardware furnished under Division 8 Finish Hardware and/or Division 26 Security in accordance with a final approved hardware schedule and templates provided by the hardware supplier and/or security supplier (including electric hinges and/or power transfers, door position switches, and other electrified hardware). Drilling and tapping for surface door closers, door closer brackets, and adjusters shall be done in field by hardware installer. Obtain templates from hardware and security suppliers. Provide hardware preparation per ANSI-A250.6.
- F. Joining at Frames:
  - 1. At welded frames with equal width jambs and head, neatly miter on face and cope and butt stops. At other welded frames, provide same mitered joint wherever possible (at intersection of jamb-head or jamb-sill) and at other locations butt metal neat. Full profile weld as specified. Fabricate so no grind marks, hollow or other out-of-plane areas are visible. At joints of intermediate members (such as mullions), provide tight joining, neatly accomplished without holes, burned out spots, weld build up or other defacing work. Fill to close cracks and to preserve shapes. Tightly fit loose stops, to hairline joints. Joints shall be finished and primed.
- G. Typical Door Reinforcement: Provide galvanized steel reinforcement as required for hardware items per manufacturers' templates. Provide 7 gage steel hinge reinforcements. Provide 16 gage steel lock reinforcements, and 14 gage steel channel or box type closer reinforcement minimum 6 inches high and 20 inches long. Projection weld hinge and lock

reinforcements to the edge of the door. Provide reinforcements for other hardware as required. Reinforce doors for surface items such as surface and semi-concealed closers, brackets, surface overhead holders and stops. Reinforcing as provided for in ANSI-A250.6.

- H. Hardware Preparation at Doors: Mortise, reinforce, drill and tap as required for all mortised hardware furnished under Division 08 Finish Hardware and/or Division 28 Access Control in accordance with a final approved hardware schedule and templates provided by the hardware supplier and/or security supplier (including a minimum 1/2 inch raceway for electrical hardware, electric hinges and/or power transfers, door position switches, and other electrified hardware). Obtain templates from hardware and security suppliers. Provide hardware preparation per ANSI-A250.6.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Prior to installation of any doors and frames, examine supporting structure and conditions under which hollow metal doors and frames are to be installed. Correct all defects prior to proceeding with installation.
- B. Correct unacceptable conditions or defer to the architect or responsible building contractor to fix unacceptable conditions prior to hollow metal installation or at any point where unacceptable conditions are discovered.

#### **3.02 PREPARATION**

- A. Where on-site modification of doors and frames is required, prepare hardware locations in accordance with the following:
1. Tornado assemblies shall not be unduly modified. Consult with the manufacturer or the Authority Having Jurisdiction as needed to maintain the labeled approval of the tornado door system, complying with ICC 500-2014.
  2. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
  3. Where doors are in rated assemblies, comply with NFPA 80 for restrictions on on-site door hardware preparation.
  4. Where on-site modification of existing doors and frames is required:
    - a. Remove existing hardware being replaced, tag, and store according to contract documents.
    - b. Field modify and prepare existing door and/or frame for new hardware being installed.
    - c. When modifications are exposed to view, use concealed fasteners, when possible.

#### **3.03 INSTALLATION**

- A. Install hollow metal in accordance with reviewed shop drawings and manufacturer's printed instructions. Securely fasten and anchor work in place without twists, warps, bulges or other unsatisfactory or defacing workmanship. Set hollow metal plumb, level, square to proper elevations, true to line and eye. Set clips and other anchors with Ramset "shot" anchors or drill in anchors as approved. Units and trim shall be fastened tightly together, with neat, uniform and tight joints.
- B. Placing Frames: Remove manufacturer's shipping spreader-bars prior to installation. These shall not be used for setting of proper frame tolerances. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set in accordance with ANSI A250.11. After wall construction is complete, remove temporary braces and/or installation spreaders leaving surfaces smooth and undamaged. In masonry construction, building-in of



anchors and grouting of frames with mortar is specified in Division 04 Section - Unit Masonry. At in-place concrete or masonry construction, set frames and secure in place using countersunk bolts and expansion shields, with bolt heads neatly filled with metallic putty, ground smooth and primed.

- C. Place fire-rated frames in accordance with NFPA 80, and/or manufacturer's follow-up procedure requirements.
- D. Consult Hollow Metal technical data and installation instruction. The hardware manufacturer's installation instructions must be followed to maintain tornado-resistant assembly approval.
- E. Provide full height 3/8 inch (9.5 mm) to 1-1/2 inch (38 mm) thick strip of polystyrene foam blocking at frames requiring grouting where continuous hinges are specified. Apply the strip to the back of the frame, where the hinge is to be installed, to facilitate field drilling or tapping.
- F. FEMA 361 doors shall be factory prepared and reinforced for hardware. Doors shall have internal concealed rods and associated latches installed at the factory by the door manufacturer prior to shipment to the job site. Installation shall be based upon FEMA lock manufacturer's template and install instructions. Field install, or supplier shop install, of FEMA concealed internal rods and rod latches will not be accepted.
- G. Door Installation: Fit hollow metal doors accurately in their respective frames, within following clearances: Jamb and head 1/8 inch, meeting edges pair of doors 1/8 inch, sill where no threshold or carpet 1/4 inch above finished floor, sill at threshold 3/4 inch maximum above finished floor, sill at carpet 1/4 inch above carpet. Place fire-rated doors with clearances as specified in NFPA 80.
- H. Apply hardware in accordance with hardware manufacturers' instructions and Section 08 71 00 of these specifications. Install hardware with only factory-provided fasteners. Install silencers. Adjust door installation to provide uniform clearance at head and jamb, to achieve maximum operational effectiveness and appearance.
- I. Drill and tap for surface door closers, door closer brackets, and other surface applied hardware.

### **3.04 FIELD QUALITY CONTROL**

- A. After installation of frames has been completed, a qualified person from the hardware installation company is to check the project to confirm the proper installation of frames to allow for the proper installation of doors and finish hardware scheduled.
- B. Installer shall deliver to owner, upon completion, one set of installation and maintenance instructions for doors and frames.
- C. Regular field inspection and adjustment is accepted and recommended to ensure proper latching throughout the life of the product.

### **3.05 ADJUSTING**

- A. Final Adjustments: Adjust doors and hardware prior to final inspection and acceptance by the Architect and Owner. Replace defective items including doors or frames that are damaged or unacceptable to the Architect and Owner. Regular field inspection and adjustment is accepted and recommended to ensure proper latching throughout the life of the product.
  - 1. Adjust doors for proper operation, free from binding or other defects.
  - 2. Clean and restore soiled surfaces. Remove scraps and debris and leave site in a clean condition.
  - 3. Prime Coat / Touch up immediately after erection, sand smooth rusted or damaged areas of prime coat, and apply touch-up of compatible, approved air-drying primer

- B. Fire Door Assembly Inspection and Testing: Upon completion of the installation, provide functional testing and inspection of each fire door assembly on the project to confirm proper operation and that it meets all criteria of a fire door assembly as per NFPA 80. Inspections shall be performed by individuals who are certified by Intertek as a Fire Door Assembly Inspector (FDAI) or a credentialed Architectural Hardware Consultant (AHC). A written report using reporting forms provided by the Door and Hardware Institute shall be maintained and transmitted to the Owner and made available to the authority having jurisdiction (AHJ). The report shall list each fire door throughout the project, and include each door number, location, hardware set used and summary of deficiencies.
1. Schedule fire door assembly inspection within 90 days of substantial completion of the project.
  2. Correct all deficiencies and schedule a re-inspection of fire door assemblies which were noted as deficient on the inspection report.
  3. Inspector shall re-inspect fire door assemblies after repairs are made.
  4. Additional re-inspections which are required due to incomplete repairs will be performed by the inspector at the expense of the Contractor.
- C. Prime Coat Touch-Up: Immediately after installation, sand smooth rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

### **3.06 PROTECTION**

- A. Provide for the proper protection of doors and frames until the Owner accepts the project as complete. Damaged or disfigured doors and frames shall be replaced or repaired by the responsible party. Some repairs may not be allowed in the field in order to maintain the labeled tornado approval. Consult with the manufacturer or the Authority Having Jurisdiction.
- B. Advise General Contractor on measures necessary to protect installed products and finished surfaces from damage during construction.

### **3.07 HARDWARE SETS**

- A. Provide hardware for tornado-resistant assemblies per the following schedule:

**END OF SECTION**

**SECTION 08 43 13**  
**ALUMINUM-FRAMED STOREFRONTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames.
- C. Weatherstripping.
- D. Door hardware.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 12 00 - Structural Steel Framing: Steel attachment members.
- B. Section 05 50 00 - Metal Fabrications: Steel attachment devices.
- C. Section 07 84 00 - Firestopping: Firestop at system junction with structure.
- D. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.
- E. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.
- F. Section 08 80 00 - Glazing: Glass and glazing accessories.
- G. Section 09 90 00 - Painting and Coating: Field painting of interior surface of infill panels

**1.03 REFERENCE STANDARDS**

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.
- C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- G. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- H. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- I. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- J. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- K. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- L. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).

- M. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).
- N. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate with installation of other components that comprise the exterior enclosure.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
- D. Samples: Submit two samples 12 inches in size illustrating finished aluminum surface, glass, glazing materials.
- E. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- F. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.
- G. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- H. Field Quality Control Submittals: Report of field testing for water penetration.
- I. Designer's Qualification Statement.
- J. Manufacturer's Qualification Statement.
- K. Installer's Qualification Statement.
- L. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

#### **1.06 QUALITY ASSURANCE**

- A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

### 1.08 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

### 1.09 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Aluminum-Framed Storefronts Manufacturers:
  - 1. Kawneer North America: [www.kawneer.com/#sle](http://www.kawneer.com/#sle).
  - 2. Oldcastle BuildingEnvelope: [www.oldcastlebe.com/#sle](http://www.oldcastlebe.com/#sle).
  - 3. Tubelite, Inc: [www.tubeliteinc.com/#sle](http://www.tubeliteinc.com/#sle).
  - 4. YKK AP America Inc: [www.ykkap.com](http://www.ykkap.com).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.

### 2.02 ALUMINUM-FRAMED STOREFRONT

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
    - 1. Glazing Position: Centered (front to back).
    - 2. Finish: Superior performing organic coatings.
      - a. Factory finish all surfaces that will be exposed in completed assemblies.
      - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
    - 3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
    - 4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
    - 5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
    - 6. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
    - 7. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
    - 8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
  - B. Performance Requirements
-

1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
  - a. Design Wind Loads: Comply with requirements of ASCE 7.
  - b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
2. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 8 psf.
3. Air Leakage: 0.06 cfm/sq ft maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf pressure difference.
4. Air Leakage: 0.06 cfm/sq ft maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf pressure difference.
5. Condensation Resistance Factor of Framing: 50, minimum, measured in accordance with AAMA 1503.

### 2.03 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
  1. Framing members for interior applications need not be thermally broken.
  2. Glazing Stops: Flush.
  3. Cross-Section: As indicated on drawings.
  4. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
- B. Glazing: As specified in Section 08 80 00.
- C. Swing Doors: Glazed aluminum.
  1. Thickness: 1-3/4 inches.
  2. Wide Stile
  3. Glazing Stops: Beveled.
  4. Finish: Same as storefront.

### 2.04 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).G
- B. Sheet Aluminum: ASTM B209 (ASTM B209M).
- C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
- D. Fasteners: Stainless steel.
- E. Exposed Flashings: Aluminum sheet, 20 gauge, 0.032 inch minimum thickness; finish to match framing members.
- F. Concealed Flashings: Galvanized steel, 26 gauge, 0.0179 inch minimum base metal thickness.
- G. Sealant for Setting Thresholds: Non-curing butyl type.
- H. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- I. Glazing Accessories: As specified in Section 08 80 00.
- J. Shop and Touch-Up Primer for Steel Components: Zinc oxide, alkyd, linseed oil primer appropriate for use over hand cleaned steel.

- K. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

## **2.05 FINISHES**

- A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating not less than 0.7 mils thick.
- B. Color: As selected by Architect from manufacturer's standard range.
- C. Touch-Up Materials: As recommended by coating manufacturer for field application.

## **2.06 HARDWARE**

- A. For each door, include weatherstripping, sill sweep strip, and threshold.
- B. Other Door Hardware: Storefront manufacturer's standard type to suit application.
1. Finish on Hand-Contacted Items: Polished stainless steel.
  2. For each door, include butt hinges, pivots, push handle, pull handle, exit device, narrow stile handle latch, and closer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

### **3.02 INSTALLATION**

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Install hardware using templates provided.
- J. Install glass in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.
- K. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

### **3.03 TOLERANCES**

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

### **3.04 FIELD QUALITY CONTROL**

- A. Provide services of storefront manufacturer's field representative to observe for proper installation of system and submit report.
- B. See Section 01 40 00 - Quality Requirements, for general testing and inspection requirements.
- C. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
  - 1. Perform a minimum of two tests in each designated area as indicated on drawings.
  - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
- D. Repair or replace storefront components that have failed designated field testing, and retest to verify performance complies with specified requirements.

### **3.05 ADJUSTING**

- A. Adjust operating hardware and sash for smooth operation.

### **3.06 CLEANING**

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.

**END OF SECTION**



**SECTION 08 51 13  
ALUMINUM WINDOWS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Extruded aluminum windows with operating sash.
- B. Factory glazing.
- C. Operating hardware.

**1.02 RELATED REQUIREMENTS**

**1.03 REFERENCE STANDARDS**

- A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights; 2017.
- B. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- C. AAMA 502 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products; 2021.
- D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- F. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors; 2002 (Reapproved 2018).
- G. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015.

**1.04 SUBMITTALS**

- A. Product Data: Provide component dimensions, information on glass and glazing, and descriptions of hardware and accessories.
- B. Shop Drawings: Indicate opening dimensions, framed opening tolerances, method for achieving air and vapor barrier seal to adjacent construction, anchorage locations, and installation requirements.
- C. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
  - 1. Evidence of AAMA Certification.
  - 2. Evidence of WDMA Certification.
  - 3. Evidence of CSA Certification.
  - 4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.
- D. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with requirements of AAMA CW-10.
- B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

### **1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 BASIS OF DESIGN - AW PERFORMANCE CLASS WINDOWS**

- A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 having Performance Class of AW, and Performance Grade at least as high as specified design pressure.
- B. Horizontal Sliding; with Matching Fixed Units:
- C. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below:
  - 1. Boyd Aluminum: [www.boydaluminum.com/#sle](http://www.boydaluminum.com/#sle).

### **2.02 ALUMINUM WINDOWS**

- A. Aluminum Windows: Extruded aluminum frame and sash, factory fabricated, factory finished, with operating hardware, related flashings, and anchorage and attachment devices.
  - 1. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for operating hardware and imposed loads.
  - 2. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
  - 3. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
  - 4. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
- B. Horizontal Sliding Type:
  - 1. Construction: Non-thermally broken.
  - 2. Glazing: Single; clear; transparent.
  - 3. Exterior Finish: Class I natural anodized.
  - 4. Interior Finish: Class I natural anodized.

### **2.03 MATERIALS**

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

### **2.04 HARDWARE**

- A. Sash lock: Lever handle with cam lock.
- B. Operator: Lever action handle fitted to projecting sash arms with limit stops.
- C. Pulls: Manufacturer's standard type.
- D. Bottom Rollers: Stainless steel, adjustable.
- E. Limit Stops: Resilient rubber.

## **2.05 FINISHES**

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

### **3.02 INSTALLATION**

- A. Install operating hardware not pre-installed by manufacturer.

### **3.03 TOLERANCES**

- A. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

### **3.04 FIELD QUALITY CONTROL**

- A. Provide field testing of installed aluminum windows by independent laboratory in accordance with AAMA 502 and AAMA/WDMA/CSA 101/I.S.2/A440 during construction process and before installation of interior finishes.
  - 1. Field test for water penetration in accordance with ASTM E1105 using Procedure B - cyclic static air pressure difference; test pressure shall not be less than 1.9 psf.
  - 2. Field test for air leakage in accordance with ASTM E783 with uniform static air pressure difference of 1.57 psf.
- B. Repair or replace fenestration components that have failed designated field testing, and retest to verify performance complies with specified requirements.

### **3.05 CLEANING**

- A. Remove protective material from factory finished aluminum surfaces.

**END OF SECTION**

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**SECTION 08 56 59**  
**SERVICE AND TELLER WINDOW UNITS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Service and teller window units.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.

**1.03 REFERENCE STANDARDS**

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- C. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate work with adjacent materials specified in other sections and as indicated on drawings and approved shop drawings.
- B. Preinstallation Meeting: Prior to start of installation arrange a meeting on site to familiarize installer and installers of related work with requirements relating to this work.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's product data for specified products indicating materials, operation, glazing, finishes, and installation instructions.
- C. Shop Drawings: Indicate configuration, sizes, rough-in, mounting, anchors and fasteners, and installation clearances.
- D. Test Data: Test reports for specific window model and glazing to be furnished, showing compliance with all specified requirements; window and glazing may be tested separately, provided window test sample adequately simulates the glazing to be used.
- E. Manufacturer Qualification Statement.
- F. Installer Qualification Statement.
- G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with at least ten years documented experience, and with ability to provide test reports showing that their standard manufactured products meet the specified requirements.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver units in manufacturer's original packaging and unopened containers with identification labels intact.

- B. Store units in area protected from exposure to weather and vandalism.

#### **1.08 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's warranty agreeing to repair or replace units and their components that fail in materials or workmanship within two years from Date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 SERVICE AND TELLER WINDOW UNITS**

- A. Location: Built within exterior wall, as indicated on drawings.
- B. Basis of Design Window: Model SCW103N, as manufactured by C. R. Laurence Company; 800-421-6144.
  - 1. Mounting: Flush with wall surface.
  - 2. Frames: Aluminum cashier window frame to be 1.390" x .625" extruded aluminum. Overall frame size to be 30" W x 32" H (includes 2" H stainless steel shelf).
  - 3. Shelf: Provide a shelf not less than 2" thick with recessed deal tray. The shelf is to be the full width of the window and 18" deep centered under the glazing.
  - 4. Material: Aluminum.
- C. Glazing: Single (monolithic), clear.
  - 1. Tempered safety glazing.
- D. Voice Transmission: Communication permitted by 834A no draft speak-thru centered in glazing.

#### **2.02 ASSEMBLY COMPONENTS**

- A. Windows: Factory-fabricated, finished, and glazed, with extruded aluminum frame and glazing stops; complete with hardware and anchors.
  - 1. Provide window units that are re-glazable from the secure side without dismantling the non-secure side of framing.
  - 2. Rigidly fit and secure joints and corners with internal reinforcement. Make joints and connections flush, hairline, and weatherproof. Fully weld corners.
  - 3. Apply factory finish to exposed surfaces.
  - 4. Wind Design: Design and size components to withstand dead loads and live loads caused by pressure and negative wind loads acting normal to plane of window as calculated in accordance with applicable code.

#### **2.03 MATERIALS**

- A. Aluminum Extrusions: Minimum 1.390" x .626" inch thick frame and sash material complying with ASTM B221 and ASTM B221M.
  - 1. Finish: Class I natural anodized.

#### **2.04 FINISHES**

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that window openings are ready for installation of windows.
- B. Verify that correct embedded anchors are in place and in proper location; repair or replace anchors as required to achieve satisfactory installation.

- C. Notify Architect if conditions are not suitable for installation of units; do not proceed until conditions are satisfactory.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install units in correct orientation (inside/outside or secure/non-secure).
- C. Anchor units securely in manner so as to achieve performance specified.
- D. Repair damaged units as directed (if approved by the manufacturer and the architect) or replace with new units.

### **3.03 CLEANING**

- A. Remove protective material from factory finished surfaces.
- B. Clean exposed surfaces promptly after installation without damaging finishes.
- C. Comply with requirements contained in the manufacturer's instructions. Remove excess glazing sealant compounds, dirt or other substances.

### **3.04 PROTECTION**

- A. Provide temporary protection to ensure that service and teller windows are without damage upon Date of Substantial Completion.

**END OF SECTION**

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**SECTION 08 71 00**

**DOOR HARDWARE**

**PART 1 - GENERAL**

**1.1 SUMMARY:**

Section Includes: Finish Hardware for door openings, except as otherwise specified herein.

- 1. Door hardware for aluminum doors.
- 2. Door hardware for wood doors.
- 3. Door hardware for other doors indicated.
- 4. Keyed cylinders as indicated.

Related Sections:

- 5. Division 6: Rough Carpentry.
- 6. Division 8: Aluminum Doors and Frames
- 7. Division 8: Hollow Metal Doors and Frames.
- 8. Division 8: Wood Doors.

References: Comply with applicable requirements of the following standards. Where these standards conflict with other specific requirements, the most restrictive shall govern.

- 9. Builders Hardware Manufacturing Association (BHMA)
- 10. NFPA 101 Life Safety Code
- 11. NFPA 80 -Fire Doors and Windows
- 12. ANSI-A156.xx- Various Performance Standards for Finish Hardware
- 13. ANSI-A117.1 – Accessible and Usable Buildings and Facilities
- 14. DHI /ANSI A115.IG – Installation Guide for Doors and Hardware

Intent of Hardware Groups

- 15. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.
- 16. Where items of hardware aren't definitely or correctly specified, are required for completion of the Work, a written statement of such omission, error, or other discrepancy to Architect, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.

**1.2 SUBSTITUTIONS:**

Comply with Division 1.

1.3 SUBMITTALS:

Comply with Division 1.

Special Submittal Requirements: Combine submittals of this Section with Sections listed below to ensure the "design intent" of the system/assembly is understood and can be reviewed together.

Product Data: Manufacturer's specifications and technical data including the following:

1. Detailed specification of construction and fabrication.
2. Manufacturer's installation instructions.
3. Submit 6 copies of catalog cuts with hardware schedule.
4. Provide 9001-Quality Management and 14001-Environmental Management for products listed in Materials Section 2.2

Shop Drawings - Hardware Schedule: Submit 6 complete reproducible copies of detailed hardware schedule in a vertical format.

5. List groups and suffixes in proper sequence.
6. Completely describe door and list architectural door number.
7. Manufacturer, product name, and catalog number.
8. Function, type, and style.
9. Size and finish of each item.
10. Mounting heights.
11. Explanation of abbreviations and symbols used within schedule.
12. Detailed wiring diagrams, specially developed for each opening, indicating all electric hardware, security equipment and access control equipment, and door and frame rough-ins required for specific opening.

Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.

13. Templates, wiring diagrams and "reviewed Hardware Schedule" of electrical terms to electrical for coordination and verification of voltages and locations.

Samples: (If requested by the Architect)

14. 1 sample of Lever and Rose/Escutcheon design, (pair).
15. 3 samples of metal finishes

Contract Closeout Submittals: Comply with Division 1 including specific requirements indicated.

16. Operating and maintenance manuals: Submit 3 sets containing the following.
  - a. Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.
  - b. Catalog pages for each product.
  - c. Name, address, and phone number of local representative for each manufacturer.
  - d. Parts list for each product.

- 17. Copy of final hardware schedule, edited to reflect, "As installed".
- 18. Copy of final keying schedule
- 19. One set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

1.4 QUALITY ASSURANCE

Comply with Division 1.

- 1. Statement of qualification for distributor and installers.
- 2. Statement of compliance with regulatory requirements and single source responsibility.
- 3. Distributor's Qualifications: Firm with 3 years experience in the distribution of commercial hardware.
  
- 4. Installer's Qualifications: Firm with 3 years experienced in installation of similar hardware to that required for this Project, including specific requirements indicated.
- 5. Regulatory Label Requirements: Provide testing agency label or stamp on hardware for labeled openings.
  - a. Provide UL listed hardware for labeled and 20 minute openings in conformance with requirements for class of opening scheduled.
  - b. Underwriters Laboratories requirements have precedence over this specification where conflict exists.
  
- 6. Single Source Responsibility: Except where specified in hardware schedule, furnish products of only one manufacturer for each type of hardware.

Review Project for extent of finish hardware required to complete the Work. Where there is a conflict between these Specifications and the existing hardware, notify the Architect in writing and furnish hardware in compliance with the Specification unless otherwise directed in writing by the Architect.

1.5 DELIVERY, STORAGE, AND HANDLING

Packing and Shipping: Comply with Division 1.

- 1. Deliver products in original unopened packaging with legible manufacturer's identification.
- 2. Package hardware to prevent damage during transit and storage.
- 3. Mark hardware to correspond with "reviewed hardware schedule".
- 4. Deliver hardware to door and frame manufacturer upon request.

Storage and Protection: Comply with manufacturer's recommendations.

1.6 PROJECT CONDITIONS:

Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.

Review Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.7 WARRANTY:

Refer to Conditions of the Contract

Manufacturer’s Warranty:

- 1. Closers: Ten years
- 2. Exit Devices: Three Years
- 3. Locksets & Cylinders: Three years
- 4. All other Hardware: Two years.

1.8 OWNER’S INSTRUCTION:

Instruct Owner’s personnel in operation and maintenance of hardware units.

1.9 MAINTENANCE:

Extra Service Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals Section.

- 1. Special Tools: Provide special wrenches and tools applicable to each different or special hardware component.
- 2. Maintenance Tools: Provide maintenance tools and accessories supplied by hardware component manufacturer.
- 3. Delivery, Storage and Protection: Comply with Owner’s requirements for delivery, storage and protection of extra service materials.

Maintenance Service: Submit for Owner’s consideration maintenance service agreement for electronic products installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

The following manufacturers are approved subject to compliance with requirements of the Contract Documents. Approval of manufacturers other than those listed shall be in accordance with Division 1.

<u>Item:</u>	<u>Manufacturer:</u>	<u>Approved:</u>
Continuous Hinges	Stanley	Hager, McKinney
Locksets	Schlage	NO SUB ON FEMA

Cylinders	Schlage	
Exit Devices	Von Duprin	
Closers	LCN	LCN 4040 XP
Push/Pull Plates	Rockwood	Hager, Trimco
Push/Pull Bars	Rockwood	Hager, Trimco
Overhead Stops	ABH	Rixson, Rockwood
Door Stops	Rockwood	Hager, Trimco
Flush Bolts	Rockwood	Hager, Trimco

2.2 MATERIALS:

Geared Continuous Hinges:

1. Certified by BHMA for ANSI A156.26 Grade 1
2. Anti-spinning through fastener
3. UL10C listed for 3 hour Fire rating
4. Non-handed
5. Lifetime warranty
6. Provide Fire Pins for 3-hour fire ratings
7. Sufficient size to permit door to swing 180 degrees

Cylindrical Type Locks and Latchsets:

8. Certified by BHMA for ANSI A156.2, Series 4000, Operational Grade 1, Extra-Heavy Duty, and be UL10C listed.
9. Provide 9001-Quality Management and 14001-Environmental Management.
10. Fit modified ANSI A115.2 door preparation.
11. Locksets and cores to be of the same manufacturer to maintain complete lockset warranty
12. Locksets to have anti-rotational studs that are thru-bolted
13. Keyed lever shall not have exposed "keeper" hole
14. Each lever to have independent spring mechanism controlling it
15. 2-3/4 inch (70 mm) backset
16. 9/16 inch (14 mm) throw latchbolt
17. Outside lever sleeve to be seamless, of one-piece construction made of a hardened steel alloy
18. Keyed lever to be removable only after core is removed, by authorized control key
19. Provide locksets with 7-pin removable and interchangeable core cylinders
20. Hub, side plate, shrouded rose, locking pin to be a one-piece casting with a shrouded locking lug.

21. Locksets outside locked lever must withstand minimum 1400 inch pounds of torque. In excess of that, a replaceable part will shear. Key from outside and inside lever will still operate lockset.
22. Core face must be the same finish as the lockset.
23. Functions and design as indicated in the hardware groups

Exit Devices:

24. Certified by BHMA for ANSI 156.3, Grade 1
25. Provide 9001-Quality Management and 14001-Environmental Management.
26. Furnish UL or recognized independent laboratory certified mechanical operational testing to 9 million cycles minimum.
27. Provide a deadlocking latchbolt
28. Non-fire rated exit devices shall have less dogging.
29. Touchpad shall be "T" style
30. Exposed components shall be of architectural metals and finishes.
31. Lever design shall match lockset lever design
32. Provide strikes as required by application.
33. Fire exit devices to be listed for UL10C
34. UL listed for Accident Hazard
35. Shall consist of a push pad, the actuating portion of which extends across, shall not be less than one half the width of the door leaf.
36. Provide vandal resistant or breakaway trim

Cylinders:

37. Provide the necessary cylinder housings, collars, rings & springs as recommended by the manufacturer for proper installation.
38. Provide the proper cylinder cams or tail piece as required to operate all locksets and other keyed hardware items listed in the hardware sets.
39. Coordinate and provide as required for related sections.

Door Closers:

40. Certified by BHMA for ANSI 156.4, Grade 1
41. UL10C certified
42. Provide 9001-Quality Management and 14001-Environmental Management.
43. Closer shall have extra-duty arms and knuckles
44. Conform to ANSI 117.1
45. Maximum 2 7/16 inch case projection with non-ferrous cover
46. Separate adjusting valves for closing and latching speed, and backcheck
47. Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions
48. Full rack and pinion type closer with 1½" minimum bore
49. Mount closers on non-public side of door, unless otherwise noted in specification
50. Closers shall be non-handed, non-sized and multi-sized.

Door Stops: Provide a dome floor or wall stop for every opening as listed in the hardware sets.

51. Wall stop and floor stop shall be wrought bronze, brass or stainless steel.

- 52. Provide fastener suitable for wall construction.
- 53. Coordinate reinforcement of walls where wall stop is specified.
- 54. Provide dome stops where wall stops are not practical. Provide spacers or carpet riser for floor conditions encountered

Over Head Stops: Provide a surface mounted or concealed overhead when a floor or wall stop cannot be used or when listed in the hardware set.

- 55. Concealed overhead stops shall be heavy duty bronze or stainless steel.
- 56. Surface overhead stops shall be heavy duty bronze or stainless steel.

Door Bolts: Flush bolts for wood or metal doors.

- 57. Provide a set of Automatic bolts, Certified ANSI/BHMA 156.3 Type 25 for hollow metal label doors.
- 58. Provide a set of Automatic bolts, Certified ANSI/BHMA 156.3 Type 27 at wood label doors.
- 59. Manual flush bolts, Certified ANSI/BHMA 156.16 at openings where allowed local authority.
- 60. Provide Dust Proof Strike, Certified ANSI/BHMA 156.16 at doors with flush bolts without thresholds.

2.3 FINISH:

Designations used in Schedule of Finish Hardware - 3.5, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products

All Finishes to match US10B Oil Rubbed Bronze.

Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

2.4 KEYS AND KEYING:

Provide keyed brass construction cores and keys during the construction period. Construction control and operating keys and core shall not be part of the Owner's permanent keying system or furnished in the same keyway (or key section) as the Owner's permanent keying system. Permanent cores and keys (prepared according to the accepted keying schedule) will be furnished to the Owner.

Cylinders, removable and interchangeable core system: Best Patented 7-pin.

Permanent keys and cores: Stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."

Transmit Grand Masterkeys, Masterkeys and other Security keys to Owner by Registered Mail, return receipt requested.

Furnish keys in the following quantities:

- 1. 1 each Grand Masterkeys
- 2. 4 each Masterkeys
- 3. 2 each Change keys each keyed core
- 4. 15 each Construction masterkeys
- 5. 3 each Construction Control keys

The Owner, or the Owner's agent, will install permanent cores and return the construction cores to the Hardware Supplier. Construction cores and keys remain the property of the Hardware Supplier.

Keying Schedule: Arrange for a keying meeting, with Architect Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying complies with project requirements. Furnish 3 typed copies of keying schedule to Architect.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

Verification of conditions: Examine doors, frames, related items and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.

- 1. Do not proceed until unsatisfactory conditions have been corrected.

**3.2 HARDWARE LOCATIONS:**

Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.

- 1. Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames, by the Door and Hardware Institute (DHI).
- 2. Recommended locations for Architectural Hardware for flush wood doors (DHI).
- 3. WDMA Industry Standard I.S.-1A-04, Industry Standard for Architectural wood flush doors.

**3.3 INSTALLATION:**

Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

Conform to local governing agency security ordinance.

Install Conforming to ICC/ANSI A117.1 Accessible and Usable Building and Facilities.



1. Adjust door closer sweep periods so that from the open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door.

Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.

3.4 FIELD QUALITY CONTROL AND FINAL ADJUSTMENT

Contractor/Installers, Field Services: After installation is complete, contractor shall inspect the completed door openings on site to verify installation of hardware is complete and properly adjusted, in accordance with both the Contract Documents and final shop drawings.

1. Check and adjust closers to ensure proper operation.
2. Check latchset, lockset, and exit devices are properly installed and adjusted to ensure proper operation.
  - a. Verify levers are free from binding.
  - b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.

Report findings, in writing, to architect indicating that all hardware is installed and functioning properly. Include recommendations outlining corrective actions for improperly functioning hardware if required.

3.5 MATERIALS

Manufacturer's Index:

- H .....HAGER HINGE
- VD .....VON DUPRIN
- SC .....SCHLAGE

3.6 HARDWARE SCHEDULE

The following is a general listing of hardware requirements and is not intended to be a final hardware schedule. Any items of hardware required by good practice or to meet state and local codes shall be furnished whether or not specifically called out in the below listed groups.

- Abbreviations: Alum = Clear / Mill Aluminum
- DW = Door Width
  - DH = Door Height
  - DOW = Door Opening Width
  - DOH = Door Opening Height
  - TBD = To Be Determined

- Finish List:
- AL = Aluminum / Clear Aluminum
  - CRM = Chrome Plated
  - NP = Nickel Plated
  - US10B= Oil Rubbed Bronze
  - 690 = Painted- Bronze
  - 628 = Aluminum / Clear Anodized
  - 630 = Stainless Steel – Satin

US32D= Stainless Steel – Satin

689 = Painted - Aluminum

SET 1 Door(s) 110			
<i>Each To Have:</i>			
IV	3 ea	Hinges	5BB1 4.5" x 4.5" US26D
SC	1 ea	Lockset – Storeroom	ND80.J.RHO.626
H	1 ea	Wall Stop	236W or 232W x US32D (as required)
H	3 ea	Silencers	307 x Gray

SET 2 Door(s) 137A, 137B, 138, 139			
<i>Each To Have:</i>			
IV	3 ea	Hinges	5BB1 4.5" x 4.5" US26D
H	1 ea	Push Plate	30S 4" x 16" x US32D
H	1 ea	Pull Plate	33E 4" x 16" x US32D
LCN	1 ea	Door Closer	4040XP x 689
H	1 ea	Kick plate	190S x 10" x 2" LDW x US32D
H	1 ea	Wall Stop	236W or 232W x US32D (as required)
H	3 ea	Silencers	307 x Gray

SET 3		Door(s) 117, 127, 119	
<i>Each To Have:</i>			
IV	3 ea	Hinges	5BB1 4.5" x 4.5" US26D
H	1 ea	Push Plate	30S 4" x 16" x US32D
H	1 ea	Pull Plate	33E 4" x 16" x US32D
H	1 ea	Indicator Deadbolt	3216 x US26D
LCN	1 ea	Door Closer	4040XP x 689
H	1 ea	Kick plate	190S x 10" x 2" LDW x US32D
H	1 ea	Wall Stop	236W or 232W x US32D (as required)
H	3 ea	Silencers	307 x Gray

SET 4		Door(s) 126, 125, 124, 116, 111, 106, 103, 121,	
<i>Each To Have:</i>			
IV	3 ea	Hinges	5BB1 4.5" x 4.5" US26D
SC	1 ea	Lockset – Storeroom	ND80.J.RHO.626
SC	1 ea	Core	Primus
LCN	1 ea	Door Closer	4040XP x 689
H	1 ea	Kick plate	190S x 10" x 2" LDW x US32D
H	1 ea	Wall Stop	236W or 232W x US32D (as required)
H	3 ea	Silencers	307 x Gray

SET 5	Door(s)	128
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*Each To Have:*

IV	3 ea	Hinges	5BB1 4.5" x 4.5" US26D
SC	1 ea	Lockset	ND70.J.RHO.626
SC	1 ea	Core	Primus
H	1 ea	Wall Stop	236W or 232W x US32D (as required)
H	3 ea	Silencers	307 x Gray

SET 6	Door(s)	105, 107, 108, 109, 112, 115, 113, 129, 130, 131, 132, 133,
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*Each To Have:*

IV	3 ea	Hinges	5BB1 4.5" x 4.5" US26D
SC	1 ea	Lockset	ND53.J.RHO.626
SC	1 ea	Core	Primus
H	1 ea	Wall Stop	236W or 232W x US32D (as required)
H	3 ea	Silencers	307 x Gray

SET 7	Door(s)	120, 123, 118,
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*Each To Have:*

IV	3 ea	Hinges	5BB1 4.5" x 4.5" US26D
SC	1 ea	Lockset – Storeroom	ND80.J.RHO.626
SC	1 ea	Core	Primus
VD	1 ea	Electric Strike	LM 6400 x 630
LCN	1 ea	Door Closer	4040XP x 689
H	1 ea	Kick plate	190S x 10" x 2" LDW x US32D
H	1 ea	Wall Stop	236W or 232W x US32D (as required)
H	3 ea	Silencers	307 x Gray

- Access Control By others

SET 8	Door(s)	135, 134
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*Each To Have:*

IV	3 ea	Hinges	5BB1 4.5" x 4.5" US26D
SC	1 ea	Mortise Lockset – Storeroom	L9080.J.RHO.626
SC	1 ea	Core	Primus
VD	1 ea	Electric Strike	LM 6400 x 630
LCN	1 ea	Door Closer	4040XP x 689
H	1 ea	Kick plate	190S x 10" x 2" LDW x US32D
H	1 ea	Wall Stop	236W or 232W x US32D (as required)
H	3 ea	Silencers	307 x Gray

- Access Control By others

SET 9	Door(s)	104, 140,
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*Each To Have:*

IV	3 ea	Hinges	5BB1 4.5" x 4.5" US26D
VD	1 ea	Exit Device	99L - NL x 626
SC	1 ea	Core	Primus
VD	1 ea	Electric Strike	DS 6114 x 630
LCN	1 ea	Door Closer	4040XP x 689
H	1 ea	Kick plate	190S x 10" x 2" LDW x US32D
H	1 ea	Wall Stop	236W or 232W x US32D (as required)
H	3 ea	Silencers	307 x Gray

- Access Control By others

SET 10	Door(s)	114, 136
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*Each To Have:*

IV	3 ea	Hinges	5BB1 4.5" x 4.5" US26D
SC	1 ea	Multi point	LM9350 x 03 x 626
SC	1 ea	Core	Primus
H	1 ea	Wall Stop	236W or 232W x US32D (as required)
H	3 ea	Silencers	307 x Gray

- Fema Rated Door unit – Hardware and Door Same Manufacturer

SET 11		Door(s) X3, X4, X6	
<i>Each To Have:</i>			
IV	1 ea	Continous Hinge – Elec	112 HD – TWP
VD	1 ea	Exit Device – Electrified	QEL 99L-NL x US26D
SC	1 ea	Core	Primus
LCN	1 ea	Door Closer	4040XP x SCUSH x 689
H	1 ea	Kick plate	190S x 10" x 2" LDW x US32D
H	1 ea	Wall Stop	236W or 232W x US32D (as required)
VD	1 ea	Power Supply	PS-902 x 900-2RS
H	1 ea	Weatherstrip	891SV x 36" x 84" x AL
H	1 ea	Threshold	412S x 36" x AL
H	1 ea	Door sweep	756S x 36" x AL

- Access Control by others

SET 12		Door(s) X1	
<i>Each To Have:</i>			
IV	2 ea	Continous Hinge – Elec	112 HD – TWP
VD	1 ea	Exit Device – Electrified	QEL 99L-NL x US26D
VD	1 ea	Exit Device – Electrified	QEL 99L- DT x US26D
SC	1 ea	Core	Primus
VD	1 ea	Removable Mull	5654 x 628
LCN	2 ea	Door Closer	4040XP x SCUSH x 689
VD	1 ea	Power Supply	PS-902 x 900-2RS

- Access Control by others
- Balance of Hardware by Aluminum Door supplier



SET 13		Door(s) X2, X5	
<i>Each To Have:</i>			
IV	1 ea	Continous Hinge – Elec	112 HD – TWP
VD	1 ea	Exit Device – Electrified	QEL 99L-NL x US26D
SC	1 ea	Core	Primus
VD	1 ea	Removable Mull	5654 x 628
LCN	1 ea	Door Closer	4040XP x SCUSH x 689
VD	1 ea	Power Supply	PS-902 x 900-2RS

- Access Control by others
- Balance of Hardware by Aluminum Door supplier

SET 14		Door(s) 101	
<i>Each To Have:</i>			
IV	4 ea	Hinges	5BB1 4.5" x 4.5" US26D
IV	2 ea	Electrified Hinges	5BB1 TW8 4.5" x 4.5" US26D
VD	1 ea	Exit Device – Electrified	QEL LBR 9927L-NL x US26D
VD	1 ea	Exit Device – Electrified	QEL LBR 9927L- DT x US26D
SC	1 ea	Core	Primus
LCN	2 ea	Door Closer – Hold Open	4040XP x HCUSH x 689
VD	1 ea	Power Supply	PS-902 x 900-2RS
H	1 ea	Kick plate	190S x 10" x 2" LDW x US32D
H	1 ea	Wall Stop	236W or 232W x US32D (as required)
H	3 ea	Silencers	307 x Gray

- Access Control by others

**Note: Door thresholds and closers must meet ADA requirements.**

**SECTION 08 80 00  
GLAZING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Insulating glass units.
- B. Glazing units.
- C. Glazing compounds and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 11 13 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.
- B. Section 08 43 13 - Aluminum-Framed Storefronts: Glazing furnished as part of storefront assembly.

**1.03 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015.
- C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- D. ASTM C1036 - Standard Specification for Flat Glass; 2016.
- E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- F. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.
- G. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- H. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2015.
- I. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
- J. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- K. GANA (GM) - GANA Glazing Manual; 2008.
- L. GANA (SM) - GANA Sealant Manual; 2008.
- M. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2017.
- N. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2014, with Errata (2017).
- O. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2017.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

- B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Samples: Submit two samples 6 by 6 inch in size of glass units.
- E. Samples: Submit 6 inch long bead of glazing sealant, color as selected.
- F. Certificate: Certify that products of this section meet or exceed specified requirements.
- G. Manufacturer's qualification statement.
- H. Installer's qualification statement.
- I. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
  - 2. Extra Insulating Glass Units: One of each glass size and each glass type.

#### **1.06 QUALITY ASSURANCE**

- A. Perform Work in accordance with GANA (GM) for glazing installation methods. Maintain one copy on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

#### **1.07 FIELD CONDITIONS**

- A. Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

#### **1.08 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Basis of Design Products: Specific brand names used in drawings and specifications are used to establish design and quality standards, performance criteria, technical characteristics, or other salient requirements. It is not intended to restrict products that are equal to these characteristics. Products that clearly and demonstrably meet the requirements may also be acceptable.
- B. Float Glass Manufacturers:
  - 1. AGC Glass North America, Inc: [www.agcglass.com/#sle](http://www.agcglass.com/#sle).
  - 2. Cardinal Glass Industries: [www.cardinalcorp.com/#sle](http://www.cardinalcorp.com/#sle).
  - 3. Guardian Glass, LLC: [www.guardianglass.com/#sle](http://www.guardianglass.com/#sle).

4. Pilkington North America Inc: [www.pilkington.com/na/#sle](http://www.pilkington.com/na/#sle).
5. Vitro Architectural Glass (formerly PPG Glass): [www.vitroglazings.com/#sle](http://www.vitroglazings.com/#sle).
6. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
  1. Design Pressure: Calculated in accordance with ASCE 7.
  2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
  3. Seismic Loads: Design and size glazing components to withstand seismic loads and sway displacement in accordance with the requirements of ASCE 7
  4. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
  5. Glass thicknesses listed are minimum.
- B. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
  1. In conjunction with vapor retarder and joint sealer materials described in other sections.
- C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
  1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
  2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
  3. Solar Optical Properties: Comply with NFRC 300 test method.

## 2.03 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
  1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
  2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
  3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
  4. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.
  5. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.
- B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
  1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class B or 16 CFR 1201 - Category II impact test requirements.
  2. Polyvinyl Butyral (PVB) Interlayer: 0.030 inch thick, minimum.
  3. Where fully tempered is specified or required, provide glass that has been tempered by the tong-less horizontal method.
  4. Provide this type of glazing in the locations required by code.
- C. Low E Glass: Float type, heat strengthened, clear.
  1. Coating on inner surface.
  2. Comply with ASTM C 1036, Type I, transparent flat, Quality Q3 (glazing select).
  3. Comply with ASTM C 1048.
  4. 6 mm minimum thick.

## 2.04 INSULATING GLASS UNITS

- A. Manufacturers:
  - 1. Any of the manufacturers specified for float glass.
- B. Insulating Glass Units: Types as indicated.
  - 1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
  - 2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
  - 3. Metal Edge Spacers: Aluminum, bent and soldered corners.
  - 4. Spacer Color: Black.
  - 5. Edge Seal:
    - a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
    - b. Color: Black.
  - 6. Purge interpane space with dry air, hermetically sealed.
- C. Insulating Glass Units: Vision glass, double glazed with Low-E coating.
  - 1. Basis of Design: Solar Ban 60 or equal.
  - 2. Applications: Exterior glazing unless otherwise indicated.
  - 3. Space between lites filled with air.
  - 4. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
    - a. Tint: Gray.
  - 5. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
    - a. Tint: Clear.
  - 6. Total Thickness: 1 inch.

## 2.05 GLAZING COMPOUNDS

- A. Glazing Putty: Polymer modified latex recommended by manufacturer for outdoor use, knife grade consistency; gray color.
- B. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.

## 2.06 ACCESSORIES

- A. Setting Blocks: Neoprene, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.
- C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
  - 1. Width: As required for application.
  - 2. Thickness: As required for application.
  - 3. Spacer Rod Diameter: As required for application.

- D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
- E. Glazing Clips: Manufacturer's standard type.

### **PART 3 EXECUTION**

#### **3.01 VERIFICATION OF CONDITIONS**

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that the minimum required face and edge clearances are being provided.
- C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- D. Verify that sealing between joints of glass framing members has been completed effectively.
- E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

#### **3.02 PREPARATION**

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

#### **3.03 INSTALLATION, GENERAL**

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

#### **3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)**

- A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

**3.05 INSTALLATION - WET GLAZING METHOD (COMPOUND AND COMPOUND)**

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inch centers, kept 1/4 inch below sight line.
- C. Locate and secure glazing pane using glazers' clips.
- D. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

**3.06 FIELD QUALITY CONTROL**

- A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- B. Monitor and report installation procedures and unacceptable conditions.

**3.07 CLEANING**

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove non-permanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

**3.08 PROTECTION**

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

**END OF SECTION**

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**SECTION 09 05 61  
COMMON WORK RESULTS FOR FLOORING PREPARATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
  - 1. Resilient tile and sheet.
  - 2. Carpet tile.
  - 3. Thin-set ceramic tile and stone tile.
- B. Removal of existing floor coverings.
- C. Preparation of new and existing concrete floor slabs for installation of floor coverings.
- D. Testing of concrete floor slabs for moisture and alkalinity (pH).
- E. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.
  - 1. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.
- F. Patching compound.
- G. Remedial floor coatings.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 22 00 - Unit Prices: Bid pricing for remediation treatments if required.
- B. Section 01 40 00 - Quality Requirements: Additional requirements relating to testing agencies and testing.
- C. Section 03 30 00 - Cast-in-Place Concrete: Limitations on curing requirements for new concrete floor slabs.

**1.03 PRICE AND PAYMENT PROCEDURES**

**1.04 REFERENCE STANDARDS**

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2020b.
- B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete; 2020.
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2019, with Editorial Revision (2020).
- D. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2016a.
- E. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- F. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; 2011.

**1.05 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

### **1.06 SUBMITTALS**

- A. Visual Observation Report: For existing floor coverings to be removed.
- B. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
  - 1. Moisture and alkalinity (pH) limits and test methods.
  - 2. Manufacturer's required bond/compatibility test procedure.
- C. Testing Agency's Report:
  - 1. Description of areas tested; include floor plans and photographs if helpful.
  - 2. Summary of conditions encountered.
  - 3. Moisture and alkalinity (pH) test reports.
  - 4. Copies of specified test methods.
  - 5. Recommendations for remediation of unsatisfactory surfaces.
  - 6. Include certification of accuracy by authorized official of testing agency.
  - 7. Submit report to Architect.
  - 8. Submit report not more than two business days after conclusion of testing.
- D. Adhesive Bond and Compatibility Test Report.
- E. Copy of RFCI (RWP).

### **1.07 QUALITY ASSURANCE**

- A. Moisture and alkalinity (pH) testing shall be performed by an independent testing agency employed and paid by Contractor.
- B. Contractor may perform adhesive and bond test with Contractor's own personnel or hire a testing agency.
- C. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
  - 1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project Owner's project contact information.
- D. Contractor's Responsibility Relating to Independent Agency Testing:
  - 1. Provide access for and cooperate with testing agency.
  - 2. Confirm date of start of testing at least 10 days prior to actual start.
  - 3. Allow at least 4 business days on site for testing agency activities.
  - 4. Achieve and maintain specified ambient conditions.
  - 5. Notify Architect when specified ambient conditions have been achieved and when testing will start.
- E. Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by coating manufacturer, and able to provide at least 3 project references showing at least 3 years' experience installing moisture emission coatings.

### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, handle, and protect products in accordance with manufacturer's instructions and recommendations.
- B. Deliver materials in manufacturer's packaging; include installation instructions.
- C. Keep materials from freezing.

### 1.09 FIELD CONDITIONS

- A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F or more than 85 degrees F.
- B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
  - 1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
  - 2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
  - 3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
- B. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.
- C. Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.
  - 1. Thickness: As required for application and in accordance with manufacturer's installation instructions.

## PART 3 EXECUTION

### 3.01 CONCRETE SLAB PREPARATION

- A. Perform following operations in the order indicated:
  - 1. Existing concrete slabs (on-grade and elevated) with existing floor coverings:
    - a. Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.
    - b. Removal of existing floor covering.
  - 2. Existing concrete slabs with coatings or penetrating sealers/hardeners/dustproofers:
  - 3. Preliminary cleaning.
  - 4. Moisture vapor emission tests; 3 tests in the first 1000 square feet and one test in each additional 1000 square feet, unless otherwise indicated or required by flooring manufacturer.
  - 5. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
  - 6. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
  - 7. Specified remediation, if required.
  - 8. Patching, smoothing, and leveling, as required.

9. Other preparation specified.
  10. Adhesive bond and compatibility test.
  11. Protection.
- B. Remediations:
1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
  2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating or remedial sheet membrane over entire suspect floor area.
  3. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

### **3.02 REMOVAL OF EXISTING FLOOR COVERINGS**

- A. Comply with local, State, and federal regulations and recommendations of RFCI Recommended Work Practices for Removal of Resilient Floor Coverings, as applicable to floor covering being removed.
- B. Dispose of removed materials in accordance with local, State, and federal regulations and as specified.

### **3.03 PRELIMINARY CLEANING**

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

### **3.04 MOISTURE VAPOR EMISSION TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F1869 and as follows.
- D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.
- F. Report: Report the information required by the test method.

### **3.05 INTERNAL RELATIVE HUMIDITY TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.

- C. Test in accordance with ASTM F2170 Procedure A and as follows.
- D. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.
- F. Report: Report the information required by the test method.

### **3.06 ALKALINITY TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. The following procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
  - 1. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.
  - 2. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.
  - 3. Use of a digital pH meter with probe is acceptable; follow meter manufacturer's instructions.
- C. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

### **3.07 PREPARATION**

- A. See individual floor covering section(s) for additional requirements.
- B. Comply with requirements and recommendations of floor covering manufacturer.
- C. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
- D. Do not fill expansion joints, isolation joints, or other moving joints.

### **3.08 ADHESIVE BOND AND COMPATIBILITY TESTING**

- A. Comply with requirements and recommendations of floor covering manufacturer.

### **3.09 APPLICATION OF REMEDIAL FLOOR COATING**

- A. Comply with requirements and recommendations of coating manufacturer.

### **3.10 PROTECTION**

- A. Cover prepared floors with building paper or other durable covering.

**END OF SECTION**

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**SECTION 09 21 16  
GYPSUM BOARD ASSEMBLIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Performance criteria for gypsum board assemblies.
- B. Metal stud wall framing.
- C. Metal channel ceiling framing.
- D. Gypsum sheathing.
- E. Cementitious backing board.
- F. Gypsum wallboard.
- G. Joint treatment and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.
- C. Section 07 21 00 - Thermal Insulation: Acoustic insulation.
- D. Section 07 25 00 - Weather Barriers - Paper Wrap: Water-resistive barrier over sheathing.
- E. Section 07 84 00 - Firestopping: Top-of-wall assemblies at fire-resistance-rated walls.
- F. Section 07 92 00 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.
- G. Section 09 30 00 - Tiling: Tile backing board.

**1.03 REFERENCE STANDARDS**

- A. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2018.
- B. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 1999 (Reaffirmed 2016).
- C. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017.
- D. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2020).
- E. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.
- F. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
- G. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2020.
- H. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2018.
- I. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
- J. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing; 2018.

- K. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units; 2019.
- L. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
- M. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.
- N. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).
- O. ASTM E413 - Classification for Rating Sound Insulation; 2016.
- P. GA-216 - Application and Finishing of Gypsum Panel Products; 2016.
- Q. GA-600 - Fire Resistance Design Manual; 2015.
- R. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- S. UL (FRD) - Fire Resistance Directory; Current Edition.

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.
- C. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
- D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- E. Test Reports: For stud framing products that do not comply with ASTM C645 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

### **PART 2 PRODUCTS**

#### **2.01 GYPSUM BOARD ASSEMBLIES**

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Interior Partitions, Indicated as Sound-Rated: Provide completed assemblies with the following characteristics:
  - 1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Fire-Resistance-Rated Assemblies: Provide completed assemblies complying with applicable code.
  - 1. ICC IBC Item Numbers: Comply with applicable requirements of ICC IBC for the particular assembly.
  - 2. Gypsum Association File Numbers: Comply with requirements of GA-600 for the particular assembly.
  - 3. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

#### **2.02 METAL FRAMING MATERIALS**

- A. Manufacturers - Metal Framing, Connectors, and Accessories:
  - 1. ClarkDietrich: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
  - 2. Marino: [www.marinoware.com/#sle](http://www.marinoware.com/#sle).



3. Phillips Manufacturing Co: [www.phillipsmfg.com/#sle](http://www.phillipsmfg.com/#sle).
  4. Steel Construction Systems; \_\_\_\_\_: [www.steelconsystems.com/#sle](http://www.steelconsystems.com/#sle).
  5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Non-structural Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
1. Studs: C-shaped with flat or formed webs with knurled faces.
  2. Runners: U shaped, sized to match studs.
  3. Ceiling Channels: C-shaped.
  4. Resilient Furring Channels: Single or double leg configuration; 1/2 inch channel depth.
    - a. Products:
      - 1) Same manufacturer as other framing materials.
- C. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and fastened as indicated on drawings.
- D. Non-structural Framing Accessories:
1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.

### 2.03 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
1. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  2. Georgia-Pacific Gypsum: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
  3. National Gypsum Company: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
  4. USG Corporation: [www.usg.com/#sle](http://www.usg.com/#sle).
  5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
  2. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  3. Thickness:
    - a. Vertical Surfaces: 5/8 inch.
    - b. Ceilings: 5/8 inch.
  4. Special Fire Resistant Type: "Type C" meeting and exceeding requirements of Type X; UL or WH rated.
    - a. Application: Where indicated.
    - b. Thickness: 1/2 inch; 5/8 inch; and 1-inch, as indicated.
    - c. Edges Tapered.
  5. Paper-Faced Products:
    - a. CertainTeed Corporation; Type X Drywall: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
    - b. Georgia-Pacific Gypsum; ToughRock Fireguard X: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
    - c. National Gypsum Company; Gold Bond BRAND Fire-Shield Gypsum Board: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
    - d. USG Corporation; USG Sheetrock Brand Firecode X Panels: [www.usg.com/#sle](http://www.usg.com/#sle).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Backing Board For Wet Areas: One of the following products:
1. Application: Surfaces behind tile in wet areas including tub and shower surrounds, shower ceilings, and as recommended behind epoxy coated walls.

2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
  - a. Thickness: 1/2 inch.
  - b. Products:
    - 1) Custom Building Products: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
    - 2) National Gypsum Company; PermaBase Cement Board: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
    - 3) USG Corporation: [www.usg.com/#sle](http://www.usg.com/#sle).
    - 4) Substitutions: See Section 01 60 00 - Product Requirements.
- D. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
  1. Application: Vertical surfaces behind thinset tile, except in wet areas.
  2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  3. Type X Thickness: 5/8 inch.
  4. Edges: Tapered.
  5. Products:
    - a. American Gypsum Company; M-Bloc Type X: [www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
    - b. Georgia-Pacific Gypsum; DensArmor Plus: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
    - c. National Gypsum Company; Gold Bond XP Gypsum Board: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
  1. Application: Ceilings, unless otherwise indicated.
  2. Thickness: 5/8 inch.
  3. Edges: Tapered.
  4. Products:
    - a. Georgia-Pacific Gypsum; ToughRock Span 24 Ceiling Board: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
    - b. USG Corporation; 1/2 Inch Sheetrock Brand UltraLight Panels: [www.usg.com/#sle](http://www.usg.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
  1. Application: Exterior sheathing, unless otherwise indicated.
  2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  3. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
  4. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  5. Core Type: Type X.
  6. Type X Thickness: 5/8 inch.
  7. Edges: Square.

#### **2.04 GYPSUM WALLBOARD ACCESSORIES**

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced.
- B. Acoustic Insulation: As specified in Section 07 21 00.

- C. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- D. Water-Resistive Barrier: As specified in Section 07 25 00.
- E. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
  - 1. Types: As detailed or required for finished appearance.
  - 2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
- F. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
  - 1. Fiberglass Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
  - 2. Paper Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
  - 3. Joint Compound: Drying type, vinyl-based, ready-mixed.
  - 4. Joint Compound: Setting type, field-mixed.
- G. Finishing Compound: Surface coat and primer, takes the place of skim coating.
- H. High Build Drywall Surfer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.
- I. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.
- J. Nails for Attachment to Wood Members: ASTM C514.
- K. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that project conditions are appropriate for work of this section to commence.

#### **3.02 FRAMING INSTALLATION**

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
  - 1. Level ceiling system to a tolerance of 1/1200.
  - 2. Laterally brace entire suspension system.
  - 3. Install bracing as required at exterior locations to resist wind uplift.
- C. Studs: Space studs at 16 inches on center.
  - 1. Extend partition framing to structure where indicated and to ceiling in other locations.
  - 2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
  - 3. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.
- D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- E. Blocking: Install wood blocking for support of:
  - 1. Framed openings.

2. Wall-mounted cabinets.
3. Plumbing fixtures.
4. Toilet partitions.
5. Toilet accessories.
6. Wall-mounted door hardware.

### **3.03 ACOUSTIC ACCESSORIES INSTALLATION**

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

### **3.04 BOARD INSTALLATION**

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- C. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- D. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.
- E. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
  1. Seal joints, cut edges, and holes with water-resistant sealant.
  2. Paper-Faced Sheathing: Immediately after installation, protect from weather by application of water-resistive barrier.
- F. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.
- G. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of nonrated double-layer assemblies, which may be installed by means of adhesive lamination.
- H. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For nonrated assemblies, install as follows:
  1. Single-Layer Applications: Screw attachment.

### **3.05 INSTALLATION OF TRIM AND ACCESSORIES**

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
  1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
  2. At exterior soffits, not more than 30 feet apart in both directions.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

### **3.06 JOINT TREATMENT**

- A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.
- B. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
- C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:

1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
  2. Level 3: Walls to receive textured wall finish.
  3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
  4. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
1. Feather coats of joint compound so that camber is maximum 1/32 inch.
  2. Taping, filling, and sanding are not required at base layer of double-layer applications.
- E. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

### **3.07 TOLERANCES**

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

**END OF SECTION**

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**SECTION 09 22 26  
DRYWALL CEILING FRAMING SYSTEM**

**PART 1 - GENERAL**

**1.01 REFERENCES**

- A. American Society for Testing and Materials (ASTM)
  - 1. ASTM A 1008 Standard specification for the Steel, Sheet, Cold Rolled Carbon, Structural, High Strength Low-Alloy and High Strength Low Alloy with Improved Formability
  - 2. ASTM A 641 Standard Specification for Zinc Coated (Galvanized) Carbon Steel Wire.
  - 3. ASTM C 635 Standard Specification for Metal Suspension Systems
  - 4. ASTM C 645-09 - Standard Specification for Nonstructural Steel Framing Members
  - 5. ASTM C 754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
  - 6. ASTM C841 Standard Specification for Installation of Interior Lathing and Furring
  - 7. ASTM C842 Standard Specification for Application of Interior Gypsum Plaster
  - 8. ASTM C 847 - Standard Specification for Metal Lath
  - 9. ASTM C926 Standard Specification for Application of Portland Cement-Based Plaster
  - 10. ASTM C 1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster (Plaster and Stucco Accessories)
  - 11. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Material
  - 12. ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint
- B. ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures
- C. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components
- D. International Code Council Evaluation Service Report ESR-1289 for Drywall Grid
- E. IAPMO Evaluation Report for ShortSpan ER0163
- F. Miami Dade County, Florida Wind Uplift Compliant
- G. International Well Building Standard
- H. Mindful Materials
- I. Living Building Challenge
- J. U.S. Department of Agriculture BioPreferred program (USDA BioPreferred).

**1.02 SUBMITTALS**

- A. Product Data:
  - 1. Submit manufacturer's technical data for each type of Metal Framing system required.
- B. Samples:
  - 1. Metal Framing System, including main runner and 4 foot cross tees.
- C. Shop Drawings:
  - 1. Layout and details of Metal Framing System. Show locations of items which are to be coordinated with, or supported by the metal suspension system.

### 1.03 QUALITY ASSURANCE

- A. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
- B. Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, and manufacturer's installation instructions.
- C. Fire Resistance Characteristics: For fire-resistance-rated assemblies that incorporate Metal framing systems provide materials and construction identical to those tested in fire resistance assembly as indicated in the construction documents and or architectural plans in accordance with ASTM E119.

### 1.04 DELIVERY, STORAGE AND HANDLING

- A. Protect and store products in manufacturer's unopened packaging until ready for installation.

### 1.05 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.

### 1.06 WARRANTY

- A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:
  - 1. Acoustical Panels: Sagging and warping
  - 2. Grid System: Rusting and manufacturer's defects
- B. Warranty Period:
  - 1. Grid: One (1) year from date of substantial completion
- C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Suspension Systems:
  - 1. BASIS OF DESIGN: Armstrong World Industries, Inc.
- B. Aluminum Custom Perimeter Trim Extruded:
  - 1. BASIS OF DESIGN: Armstrong World Industries, Inc.
- C. Perimeter Systems:
  - 1. BASIS OF DESIGN: Armstrong World Industries, Inc.
- D. DRYWALL SUSPENSION SYSTEMS
  - 1. BASIS OF DESIGN: Armstrong Drywall Suspension Systems all main beams and cross tees shall be commercial quality hot-dipped galvanized steel
  - 2. Tee: manufactured main beam- 1-1/2" knurled face with ScrewStop™ reverse hem by 1-11/16 inches high. Drywall Main Beams are factory punched with crosstee routs and hanger wire holes and SuperLock™ main beam clip for a strong secure connection and fast accurate alignment. Both ShortSpan and Drywall Main Beams are Heavy-duty performance per ASTM C635
    - a. HD8906HRC - 12ft HD Drywall Main Beam HRC 1-1/2"



3. Tee: manufactured ShortSpan Tee- 1-1/2" knurled face with ScrewStop™ reverse hem - height - 1-11/16 inches - Heavy-duty performance per ASTM C635
  - a. S7708G90 - 8ft ShortSpan Tee
4. Cross Tees: manufactured main beam- 1-1/2" knurled face with ScrewStop™ reverse hem by 1-1/2 inches high with factory punched cross tee routs and hanger wire holes and XL stake on clip for a strong secure connection.
  - a. S7708P - 8' ShortSpan PeakForm Tee
5. Wall Molding:
  - a. KAM10 - 10ft Knurled Angle Molding 1-1/4" Face
6. Hanger wire: a Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least time three times the design load, but not less than 12-gauge.

**2.02 ACCESSORIES:**

- A. LWA12 - 12ft Capped Locking Wall Angle
- B. ALBERC2 - Aluminum Beam End Retaining Clip

**PART 3 - EXECUTION**

**3.01 EXAMINATION**

- A. Prior to installation, inspect previous work of all other trades. Verify that all work is complete and accurate to the point where this installation may properly proceed in strict accordance with framing shop drawings.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Installation: In accordance with all approved plans, details, and manufacturer's installation guidelines located in the Armstrong Drywall Grid Systems and ShortSpan Installation Guides.
  1. Install seismic components if required by the building code. Seismic components to be specified on the architectural plans by the project engineer or design team.

**END OF SECTION**

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**SECTION 09 30 00  
TILING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Non-ceramic trim.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 92 00 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.
- B. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.
- C. Section 09 21 16 - Gypsum Board Assemblies: Tile backer board.

**1.03 REFERENCE STANDARDS**

- A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2019.
- B. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2017.
- C. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar; 2017.
- D. ANSI A108.1c - Contractor's Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2021).
- E. ANSI A108.2 - American National Standard General Requirements: Materials, Environmental and Workmanship; 2019.
- F. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesive or Water Cleanable Tile-Setting Epoxy Adhesive; 2019.
- G. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 2021.
- H. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grout Epoxy; 1999 (Reaffirmed 2019).
- I. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 1999 (Reaffirmed 2019).
- J. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1999 (Reaffirmed 2019).
- K. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 2017 (Reaffirmed 2022).
- L. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar; 1999 (Reaffirmed 2019).
- M. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2005 (Reaffirmed

2016).

- N. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar; 2017.
- O. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive; 2013 (Revised).
- P. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2012 (Revised).
- Q. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation; 2010 (Reaffirmed 2016).
- R. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation; 2014.
- S. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2022.
- T. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products; 2018.
- U. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2019.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by affected installers.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches in size illustrating pattern, color variations, and grout joint size variations.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

#### **1.06 QUALITY ASSURANCE**

- A. Maintain one copy of and ANSI A108/A118/A136 and TCNA (HB) on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.
- C. Installer Qualifications:
  - 1. Company specializing in performing tile installation, with minimum of five years of documented experience.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

#### **1.08 FIELD CONDITIONS**

- A. Do not install solvent-based products in an unventilated environment.

- B. Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

## **PART 2 PRODUCTS**

### **2.01 TILE**

- A. Manufacturers:
1. American Olean Corporation: [www.americanolean.com/#sle](http://www.americanolean.com/#sle).
  2. Dal-Tile Corporation: [www.daltile.com/#sle](http://www.daltile.com/#sle).
  3. Emser Tile, LLC: [www.emser.com/#sle](http://www.emser.com/#sle).
  4. Florida Tile.
  5. Stonepeak.
  6. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Porcelain Tile: ANSI A137.1 standard grade.
1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
  2. Size: 24 by 48 inch, nominal.
  3. Thickness: 9mm.
  4. Color(s): To be selected by Architect from manufacturer's standard range.

### **2.02 TRIM AND ACCESSORIES**

- A. Non-Ceramic Trim: Satin natural anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
1. Applications:
    - a. Open edges of wall tile.
    - b. Open edges of floor tile.
    - c. Wall corners, outside and inside.
    - d. Transition between floor finishes of different heights.
    - e. Floor to wall joints.
    - f. Borders and other trim as indicated on drawings.
  2. Basis of Design Manufacturers:
    - a. Schluter-Systems: [www.schluter.com/#sle](http://www.schluter.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.03 SETTING MATERIALS**

- A. Manufacturers:
1. ARDEX Engineered Cements: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
  2. Bostik Inc: [www.bostik-us.com/#sle](http://www.bostik-us.com/#sle).
  3. Custom Building Products: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
  4. H.B. Fuller Construction Products, Inc: [www.tecspecialty.com/#sle](http://www.tecspecialty.com/#sle).
  5. LATICRETE International, Inc: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
  6. Merkrete, by Parex USA, Inc: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
  7. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.
1. Applications: Use this type of bond coat where indicated, and where no other type of bond coat is indicated, or where large and heavy tile is indicated.
  2. Products:
    - a. ARDEX Engineered Cements; ARDEX X 77 MICROTEC: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Custom Building Products; ProLite Premium Rapid Setting Large Format Tile Mortar, with Multi-Surface Bonding Primer: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).

- c. H.B. Fuller Construction Products, Inc; TEC Ultimate Large Tile Mortar: [www.tecspecialty.com/#sle](http://www.tecspecialty.com/#sle).
- d. LATICRETE International, Inc; 257 TITANIUM: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
- e. Merkrete, by Parex USA, Inc; Merkrete 720 Marble Pro: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).

## 2.04 GROUTS

- A. Manufacturers:
  - 1. ARDEX Engineered Cements: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
  - 2. Bostik Inc: [www.bostik-us.com/#sle](http://www.bostik-us.com/#sle).
  - 3. Custom Building Products: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
  - 4. H.B. Fuller Construction Products, Inc: [www.tecspecialty.com/#sle](http://www.tecspecialty.com/#sle).
  - 5. LATICRETE International, Inc: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
  - 6. Merkrete, by Parex USA, Inc: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
- B. High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
  - 1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
  - 2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
  - 3. Color(s): As selected by Architect from manufacturer's full line.
- C. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
  - 1. Applications: Where indicated.
  - 2. Color(s): As selected by Architect from manufacturer's full line.
- D. Stain Resistant Grout Additive: Liquid admixture for sanded and unsanded cement-based grouts; mix with dry grout material in place of water.
  - 1. Applications: Where indicated.

## 2.05 MAINTENANCE MATERIALS

- A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
  - 1. Applications: Between tile and plumbing fixtures.
  - 2. Color(s): As selected by Architect from manufacturer's full line.

## 2.06 ACCESSORY MATERIALS

- A. Concrete Floor Slab Crack Isolation Membrane: Material complying with ANSI A118.12; not intended as waterproofing.
  - 1. Crack Resistance: No failure at 1/16 inch gap, minimum.
  - 2. Fluid or Trowel Applied Type:
    - a. Material: Synthetic rubber or Acrylic.
    - b. Thickness: 20 mils, maximum.
- B. Mesh Tape: 2 inch wide self-adhesive fiberglass mesh tape.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

- C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for tiling installation by testing for moisture and alkalinity (pH).
  - 1. Test in accordance with Section 09 05 61.
  - 2. Obtain instructions if test results are not within limits recommended by tiling material manufacturer and setting material manufacturer.
  - 3. Follow moisture and alkalinity remediation procedures in Section 09 05 61.
- E. Verify that required floor-mounted utilities are in correct location.

### **3.02 PREPARATION**

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

### **3.03 INSTALLATION - GENERAL**

- A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.19, manufacturer's instructions, and TCNA (HB) recommendations.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install ceramic accessories rigidly in prepared openings.
- G. Install non-ceramic trim in accordance with manufacturer's instructions.
- H. Install thresholds where indicated.
- I. Sound tile after setting. Replace hollow sounding units.
- J. Keep control and expansion joints free of mortar, grout, and adhesive.
- K. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- L. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.
- M. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

### **3.04 INSTALLATION - FLOORS - THIN-SET METHODS**

- A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.

### **3.05 INSTALLATION - WALL TILE**

- A. Over interior concrete and masonry install in accordance with TCNA (HB) Method W202, thin-set with dry-set or latex-Portland cement bond coat.
- B. Over metal studs without backer install in accordance with TCNA (HB) Method W241, mortar bed, with membrane where indicated.

**3.06 CLEANING**

- A. Clean tile and grout surfaces.

**3.07 PROTECTION**

- A. Do not permit traffic over finished floor surface for 4 days after installation.

**END OF SECTION**



**SECTION 09 51 00  
ACOUSTICAL CEILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 05 31 00 - Steel Decking: Placement of special anchors or inserts for suspension system.
- C. Section 07 21 00 - Thermal Insulation: Acoustical insulation.
- D. Section 08 31 00 - Access Doors and Panels: Access panels.

**1.03 REFERENCE STANDARDS**

- A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2017.
- C. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2019.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning.
- C. Product Data: Provide data on suspension system components and acoustical units.
- D. Samples: Submit two samples 6 by 6 inch in size illustrating material and finish of acoustical units.
- E. Samples: Submit two samples each, 6 inches long, of suspension system main runner, cross runner, and perimeter molding.
- F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

**1.06 FIELD CONDITIONS**

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

**PART 2 PRODUCTS**

**2.01 PERFORMANCE REQUIREMENTS**

- A. Seismic Performance: Ceiling systems designed to withstand the effects of earthquake motions determined according to ASCE 7 for Seismic Design Category D, E, or F and

complying with the following:

1. Local authorities having jurisdiction.

## **2.02 ACOUSTICAL UNITS**

- A. Acoustical Units - General: ASTM E1264, Class A.
  1. VOC Content: As specified in Section 01 61 16.
- B. Acoustical Panels: Painted mineral fiber, with the following characteristics:
  1. Classification: ASTM E1264 Type III.
    - a. Form: 2, water felted.
  2. Size: 24 by 24 inches.
  3. Thickness: 3/4 inch.
  4. Panel Edge: Square.
  5. Suspension System: Exposed grid.
- C. Acoustical Panels, Type \_\_\_\_: Mineral fiber with membrane-faced overlay, with the following characteristics:
  1. Classification: ASTM E1264 Type IV.
  2. Size: 24 by 24 inches.
  3. Thickness: 3/4 inch.
  4. Panel Edge: Square.
  5. Suspension System Type \_\_\_\_: Exposed grid.

## **2.03 SUSPENSION SYSTEM(S)**

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
- B. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
- C. Exposed Suspension System: Hot-dipped galvanized steel grid with aluminum cap.
  1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
  2. Profile: Tee; 15/16 inch face width.
  3. Finish: Baked enamel.
  4. Color: White.

## **2.04 ACCESSORIES**

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.
- C. Hold-Down Clips: Manufacturer's standard clips to suit application.
- D. Seismic Clips: Manufacturer's standard clips for seismic conditions and to suit application.
- E. Perimeter Moldings: Same metal and finish as grid.
  1. Size: As required for installation conditions and specified Seismic Design Category.
  2. Angle Molding: L-shaped, for mounting at same elevation as face of grid.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
-

- B. Verify that layout of hangers will not interfere with other work.

### **3.02 PREPARATION**

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.
- C. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.

### **3.03 INSTALLATION - SUSPENSION SYSTEM**

- A. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- B. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
  - 1. Use longest practical lengths.
- C. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- D. Seismic Suspension System, Seismic Design Categories D, E, F: Hang suspension system with grid ends attached to the perimeter molding on two adjacent walls; on opposite walls, maintain a 3/4 inch clearance between grid ends and wall.
- E. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- F. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- G. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- H. Do not eccentrically load system or induce rotation of runners.

### **3.04 INSTALLATION - ACOUSTICAL UNITS**

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- E. Cutting Acoustical Units:
  - 1. Make field cut edges of same profile as factory edges.
- F. Lay acoustical insulation for a distance of 48 inches either side of acoustical partitions as indicated.
- G. Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.

### **3.05 TOLERANCES**

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

**END OF SECTION**

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**SECTION 09 65 00  
RESILIENT FLOORING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Resilient tile flooring.
- B. Resilient base.
- C. Installation accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 09 05 61 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.
- C. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.

**1.03 REFERENCE STANDARDS**

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2019a, with Editorial Revision (2020).
- B. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2004 (Reapproved 2018).
- C. ASTM F1861 - Standard Specification for Resilient Wall Base; 2016.
- D. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2019.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Shop Drawings: Indicate seaming plans and floor patterns.
- D. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- E. Verification Samples: Submit two samples, 6 by 6 inch in size illustrating color and pattern for each resilient flooring product specified.
- F. Sustainable Design Submittal: Submit VOC content documentation for flooring and adhesives.
- G. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- H. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of subfloor is acceptable.
- I. Manufacturer's Qualification Statement.
- J. Installer's Qualification Statement.
- K. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.
- C. Testing Agency Qualifications: Independent firm specializing in performing concrete slab moisture testing and inspections of the type specified in this section.

### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- D. Do not double stack pallets.

### 1.07 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

## PART 2 PRODUCTS

### 2.01 TILE FLOORING

- A. Luxury Vinyl Planks and Tile: Homogeneous, with color extending throughout thickness.
  - 1. Manufacturers:
    - a. Armstrong Flooring, Inc: [www.armstrongflooring.com/#sle](http://www.armstrongflooring.com/#sle).
    - b. Johnsonite, a Tarkett Company: [www.johnsonite.com/#sle](http://www.johnsonite.com/#sle).
    - c. Mohawk Group: [www.mohawkgroup.com](http://www.mohawkgroup.com).
    - d. J & J Flooring: [www.jjflooring.com](http://www.jjflooring.com)
    - e. Substitutions: See Section 01 60 00 - Product Requirements.
  - 2. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
  - 3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
  - 4. Size: 18 by 36 inch.
  - 5. VOC Content Limits: As specified in Section 01 61 16.
  - 6. Thickness: 4.5mm minimum with 20mil wear layer.
  - 7. Color: To be selected by Architect from manufacturer's full range.

### 2.02 RESILIENT BASE

- A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; style as scheduled.
  - 1. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
  - 2. Height: 4 inch.
  - 3. Thickness: 0.125 inch.
  - 4. Finish: Satin.
  - 5. Length: Roll.
  - 6. Color: To be selected by Architect from manufacturer's full range.
  - 7. Accessories: Premolded external corners and internal corners.

### **2.03 ACCESSORIES**

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
  - 1. VOC Content Limits: As specified in Section 01 61 16.
- C. Moldings, Transition and Edge Strips: Same material as flooring.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
  - 1. Test in accordance with Section 09 05 61.
  - 2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
  - 3. Follow moisture and alkalinity remediation procedures in Section 09 05 61.

### **3.02 PREPARATION**

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is fully cured.
- D. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

### **3.03 INSTALLATION - GENERAL**

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.

### **3.04 INSTALLATION - TILE FLOORING**

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.
- C. Install square tile to ashlar pattern. Allow minimum 1/2 full size tile width at room or area perimeter.

### **3.05 INSTALLATION - RESILIENT BASE**

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.

**3.06 CLEANING**

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

**3.07 PROTECTION**

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

**END OF SECTION**



**SECTION 09 74 26  
WOOD WALL SYSTEM**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wood veneer panels.

**1.02 REFERENCE STANDARDS**

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate accessory attachments and wood panel layout and coordination of electrical and mechanical devices.
- C. Product Data: Provide data on wood grille and attachments.
- D. Samples: Submit one 12 by 12 inch samples illustrating material and finish of wood components.
- E. Test Reports: Certified test data from an independent test agency verifying that panels meet specified requirements for fire and seismic performance.
- F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- G. Designer's qualification statement.
- H. Manufacturer's qualification statement.
- I. Installer's qualification statement.
- J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements for additional provisions.

**1.04 QUALITY ASSURANCE**

- A. Designer Qualifications for Seismic Design: Perform design under direct supervision of Professional Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with at least three years documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

**1.05 MOCK-UPS**

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Construct 6 feet by 6 feet mock-up including suspension members, trim, and wood ceiling components.
- C. Locate where directed.
- D. Mock-up may remain as part of the work.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver wood components to project site in original, unopened packages.
- B. Store in fully enclosed space, flat, level and off the floor.

### 1.07 FIELD CONDITIONS

- A. Do not install suspended wood system until wet construction work is complete and permanent heat and air conditioning is installed and operating.
- B. Maintain room temperature between 60 degrees F and 75 degrees F and relative humidity between 35 to 55 percent before, during, and after installation.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Wood Wall System:
  - 1. Basis of Design: Armstrong World Industries, Inc. ; Woodworks:  
[www.armstrongceilings.com/#sle](http://www.armstrongceilings.com/#sle).
  - 2. Or equal, as prior approved by Architect, provided they meet performance and aesthetic requirements.
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.

### 2.02 WOOD WALL SYSTEM

- A. Performance Requirements:
  - 1. Design for maximum deflection of 1/360 of span.
  - 2. Design to resist seismic load by using practices specified in ASTM E580.
- B. Wood Panels:
  - 1. Panel Size: 24 by 48 inches.
  - 2. Species: Poplar.
    - a. Factory Finish: To be selected from manufacturer's full line.
  - 3. Edge Profile: As indicated on drawings.

### 2.03 FABRICATION

- A. Shop fabricate wood components to the greatest extent possible.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Do not install panels until after interior wet work is dry.

### 3.02 INSTALLATION

- A. Wood Wall Panels:
  - 1. Install wood panels in accordance with manufacturer's instructions.
  - 2. Fit wood components in place, free from damaged edges or other defects detrimental to appearance and function.
  - 3. Install components in uniform plane, and free from twist, warp, and dents.
  - 4. Cut to fit irregular grid and perimeter edge trim.
  - 5. Make field cut edges of same profile as factory edges, seal and finish according to manufacturer.
  - 6. Install clips, stabilizer bars, and other attachments as indicated to secure wood panels components tight to the grid system.

### 3.03 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

**3.04 CLEANING**

- A. Clean and touch up minor finish damage. Remove and replace components that cannot be successfully cleaned and repaired.

**END OF SECTION**

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**SECTION 09 90 00  
PAINTING AND COATING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Interior painting and coating systems.
- C. Exterior painting and coating systems.
- D. Scope:
  - 1. Finish surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
    - a. Exterior:
      - 1) Masonry: Concrete masonry units or concrete brick.
      - 2) Metal: Aluminum, galvanized.
      - 3) Metal, Miscellaneous: Iron, ornamental iron, structural iron and steel, and other ferrous metal.
      - 4) Wood: Siding, trim, shutters, sashes, and hardboard-bare/primed.
      - 5) Drywall: Gypsum board and exterior drywall.
    - b. Interior:
      - 1) Concrete Masonry Units: Concrete, split face, scored, smooth, high density, low density, and fluted.
      - 2) Metal: Aluminum and galvanized.
      - 3) Metal, Galvanized: Ceilings and ductwork.
      - 4) Metal: Structural steel columns, joists, trusses, beams, miscellaneous and ornamental iron, structural iron, and other ferrous metal.
      - 5) Wood: Walls, ceilings, doors, and trim.
      - 6) Drywall: Walls, ceilings, gypsum board, and similar items.
  - 2. Do not paint or finish the following:
    - a. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
    - b. Items indicated to receive other finishes.
    - c. Items indicated to remain unfinished.
    - d. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
    - e. Non-metallic roofing and flashing.
    - f. Stainless steel, anodized aluminum, bronze, terne, and lead items.
    - g. Marble, granite, slate, and other natural stones.
    - h. Floors, unless specifically so indicated.
    - i. Ceramic and other tiles.
    - j. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
    - k. Exterior insulation and finish system (EIFS).
    - l. Glass.
    - m. Concrete masonry in utility, mechanical, and electrical spaces.
    - n. Acoustical materials, unless specifically so indicated.
    - o. Concealed pipes, ducts, and conduits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

- B. Section 05 50 00 - Metal Fabrications: Shop-primed items.

### 1.03 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- C. SSPC-SP 2 - Hand Tool Cleaning; 2018.
- D. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

### 1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
  - 1. Product characteristics: Provide a list of required coating materials. Cross-reference each product to paint system, and locations of applications areas. Identify each material by manufacturer's catalog number. Use the same designations indicated on drawings and in schedules.
  - 2. Surface preparation instructions and recommendations.
  - 3. Primer requirements and finish specification.
  - 4. Storage and handling requirements and recommendations.
  - 5. Application methods.
  - 6. Clean-up information.
- C. Samples: Submit four paper draw down samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified and sheen of topcoat.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Applicator's qualification statement.
- F. Maintenance Data: Submit coating maintenance manual including finish schedule showing where each product/color/finish was used, product technical data sheets, safety data sheets (SDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements for additional provisions.
  - 2. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
  - 3. Label each container with color in addition to manufacturer's label.

### 1.05 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience and approved by manufacturer.
- B. Paint Coordination: Use block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.
- C. Regulatory Requirements: Comply with applicable codes and regulations of governmental agencies having jurisdiction over airborne emissions and industrial waste disposal. Where those requirements conflict with this specification, comply with the more stringent provisions.
  - 1. Regulatory changes may affect the formulation, availability or use of specified coatings. Confirm availability of coatings to be used.

### 1.06 SHEENS AND GLOSSES

- A. Paints are available in a wide range of sheens or glosses, as measured by a gloss meter from a 60 and/or 85 degree angle from vertical, as a percentage of the amount of light that is reflected. The following terms are used to describe the gloss of our products. The list below is provided for general guidance; refer to the technical data sheet for the actual gloss/sheen level for each product.
1. Flat - Less than 5 Percent.
  2. Eggshell - 5 - 20 Percent.
  3. Satin - 20 - 35 Percent.
  4. Semi-Gloss - 30 - 65 Percent.
  5. Gloss - Over 65 Percent.

### 1.07 MOCK-UPS

- A. See Section 01 40 00 - Quality Requirements for general requirements for mock-ups.
- B. Provide one accent wall as directed by Architect to demonstrate color and finish.
- C. Locate where directed by Architect.
- D. Mock-up may remain as part of the work.

### 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, product name, product code, color designation, VOC content, batch date, environmental handling, surface preparation, application, and use instructions.
- C. Paint Materials: Store at a minimum of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.
- D. Handling: Maintain a clean, dry storage area to prevent contamination or damage to materials.
- E. Disposal:
1. Never pour leftover coating down any sink or drain. Use up material on the job or seal can and store safely for future use.
  2. Do not incinerate closed containers.
  3. For specific disposal or recycle guidelines, contact the local waste management agency or district. Recycle whenever possible.

### 1.09 FIELD CONDITIONS

- A. Do not apply materials when environmental conditions are outside the ranges required by manufacturer.
- B. Follow manufacturer's recommended procedures for producing the best results, including testing substrates, moisture in substrates, and humidity and temperature limitations.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Acceptable Manufacturers:
1. Farrell-Calhoun Paint, 221 E. Carolina Avenue, Memphis, TN 38126.
  2. Benjamin Moore and Co: 101 Paragon Dr ; Montvale, NJ 07645; Toll Free Tel: 866-708-9181; Email: [info@benjaminmoore.com](mailto:info@benjaminmoore.com); Web:[www.benjaminmoore.com](http://www.benjaminmoore.com).
  3. Sherwin Williams [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).

## 2.02 PAINTINGS AND COATINGS

- A. Material Quality: Provide manufacturer's best quality material of the coating types specified. Provide paints and coatings capable of being readily and uniformly dispersed to complete homogeneous mixture. Provide paints that exhibit good flow and brushing properties and are capable of drying or curing free of streaks and sags.
  - 1. Provide factory-mixed coatings unless otherwise indicated.
  - 2. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application.
  - 3. Do not reduce, thin, or dilute coatings or add materials to coatings unless specifically indicated in manufacturer's instructions.
- B. Volatile Organic Compound (VOC) Content:
  - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
    - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
    - b. Architectural coatings VOC limits of State in which the project is located.
  - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site, or other method acceptable to authorities having jurisdiction.
- C. Compatibility: Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- D. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- E. Colors: Provide color samples provided by manufacturer of paint system approved for use. Match approved samples for color, texture and coverage.

## 2.03 PAINT SYSTEMS - EXTERIOR

- A. Masonry: Concrete masonry units (CMU), cinder or concrete block.
  - 1. Latex Systems:
    - a. Flat Finish: Sherwin Williams:
      - 1) Prime Coat: SW PrepRite Block Filler, B25W25: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
      - 2) 2nd and 3rd Coat: SW A-100 Exterior Latex Flat, A6 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - b. Flat Finish: Farrell-Calhoun
      - 1) Prime Coat: FC Interior/Exterior Latex Masonry Block Filler 470 or 470A.
      - 2) 2nd and 3rd Coat: FC 100% Acrylic Exterior Flat Latex 200 Line.
    - c. Flat Finish: Benjamin Moore
      - 1) Prime Coat: Coronado Super Kote 5000 Production Block Filler 958-11 (35 g/L), MPI # 4, X-Green 4, LEED V4, CHPS Certified.
      - 2) 2nd and 3rd Coat: Coronado Cryli Cote 100% Acrylic Flat House & Trim Paint 10 (44 g/L), MPI # 10.
- B. Metal: Aluminum, Galvanized.
  - 1. Latex Systems:
    - a. Semi-Gloss Finish: Sherwin Williams
      - 1) Prime Coat:



- 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Acrylic Semi-Gloss, B66-650 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - b. Gloss Finish: Farrell Calhoun
      - 1) Prime Coat: Primer, latex, interior/exterior: FC 100% Acrylic All Purpose DTM Primer 5-56.
      - 2) 2nd and 3rd Coat: Latex, exterior, gloss: FC 100% Acrylic Exterior Gloss Enamel 2400 Line
    - c. Semi-Gloss Finish: Benjamin Moore
      - 1) Prime Coat: Ultra Spec HP Acrylic DTM Semi-Gloss Enamel HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009.
      - 2) 2nd and 3rd Coat: Ultra Spec HP Acrylic DTM Semi-Gloss Enamel HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009.
  - 2. Alkyd Systems, Water-Based:
    - a. Semi-Gloss Finish: Sherwin Williams
      - 1) Prime Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
      - 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Water Based Alkyd Urethane Enamel Semi-Gloss, B53-1150 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - b. Gloss Finish: Farrell Calhoun
      - 1) Prime Coat: Primer, latex, interior/exterior - FC 100% Acrylic All Purpose DTM Primer 5-56.
      - 2) 2nd and 3rd Coat: Alkyd, interior/exterior, gloss - FC Tuff-Boy Industrial Gloss Enamel 800 Line.
- C. Metal, Miscellaneous: Iron, ornamental iron, structural iron and steel, ferrous metal.
- 1. Latex Systems:
    - a. Semi-Gloss Finish: Sherwin Williams
      - 1) Prime Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
      - 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Acrylic Semi-Gloss, B66-650 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - b. Semi-Gloss Finish: Farrell Calhoun
      - 1) Prime Coat: Primer, latex, interior/exterior - FC 100% Acrylic All Purpose DTM Primer 5-56.
      - 2) 2nd and 3rd Coat: Latex, exterior, gloss: FC 100% Acrylic Exterior Gloss Enamel 2400 Line.
    - c. Semi-Gloss Finish: Benjamin Moore
      - 1) Prime Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
      - 2) 2nd and 3rd Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Semi-Gloss Enamel, HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009, LEED V4.
  - D. Wood: Siding, trim, shutters, sashes, and hardboard-bare/primed.
    - 1. Latex Systems:
      - a. Semi-Gloss Finish: Sherwin Williams
        - 1) Prime Coat: Sherwin-Williams Latex Wood Primer, B42W8041: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
        - 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Acrylic Semi-Gloss, B66-650 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
      - b. Gloss Finish: Farrell Calhoun

- 1) Prime Coat: Primer, latex, interior/exterior - FC 100% Acrylic Latex Undercoater 235.
  - 2) 2nd and 3rd Coat: Latex, exterior, gloss - FC 100% Acrylic Exterior Gloss Enamel 2400 Line.
  - c. Semi-Gloss Finish: Benjamin Moore
    - 1) 1st Coat: Benjamin Moore Fresh Start High-Hiding All Purpose Primer 046 (44 g/L), MPI # 6, 17, X-Green 17, 39, 50, X-Green 50, 137, X-Green 137, LEED Credit, CHPS Certified.
    - 2) 2nd Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Semi-Gloss Enamel, HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009, LEED V4.
- E. Drywall: Gypsum board - Exterior Drywall.
1. Latex Systems:
    - a. Satin Finish: Sherwin Williams
      - 1) Prime Coat: Sherwin-Williams Latex Wood Primer, B42W8041: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
      - 2) 2nd and 3rd Coat: Sherwin-Williams A-100 Exterior Latex Satin, A82 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - b. Satin Finish: Farrell Calhoun
      - 1) Prime Coat: Primer, latex, interior/exterior - FC 100% Acrylic Latex Undercoater 235.
      - 2) 2nd and 3rd Coat: Latex, exterior, satin - FC Durashield 100% Acrylic Exterior Satin Enamel 3200 Line.
    - c. Satin Finish: Benjamin Moore
      - 1) Prime Coat: Benjamin Moore Fresh Start High-Hiding All Purpose Primer 046 (44 g/L), MPI # 6, 17, X-Green 17, 39, 50, X-Green 50, 137, X-Green 137, LEED Credit, CHPS Certified.
      - 2) 2nd and 3rd Coat: Benjamin Moore ben Exterior Low Luster 542 (45 g/l), MPI # 15.

#### 2.04 PAINT SYSTEMS - INTERIOR

- A. Masonry CMU: Concrete, split face, scored, smooth, high density, low density, and fluted.
1. Epoxy Systems, Water-Based:
    - a. Semi-Gloss Finish - Sherwin Williams:
      - 1) Prime Coat: Sherwin-Williams Loxon Block Surfacer, LX01W200: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
      - 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - b. Semi-Gloss Finish - Farrell Calhoun
      - 1) Prime Coat: Block filler, latex, interior/exterior - FC Interior/Exterior Latex Masonry Block Filler 470.
      - 2) 2nd and 3rd Coat: Latex, interior, semi-gloss - FC 100% Acrylic Semi-Gloss Latex Enamel 600 Line
    - c. Eg-Shel/Low Luster Finish - Sherwin Williams:
      - 1) Prime Coat: Sherwin-Williams Loxon Block Surfacer, LX01W200: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
      - 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, K45 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - d. Eg-Shel/Low Luster Finish - Farrell Calhoun

- 1) Prime Coat: Block filler, latex, interior/exterior - FC Interior/Exterior Latex Masonry Block Filler 470.
  - 2) 2nd and 3rd Coat: FC Premium Latex Eggshell Enamel 370 Line.
- B. Metal: Aluminum and galvanized.
1. Latex Systems:
    - a. Semi-Gloss Finish: Sherwin Williams
      - 1) Prime Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
      - 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Acrylic Semi-Gloss, B66-650 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - b. Semi-Gloss Finish: Farrell Calhoun
      - 1) Prime Coat: Primer, latex, interior/exterior - FC 100% Acrylic All Purpose DTM Primer 5-56.
      - 2) 2nd and 3rd Coat: FC 100% Acrylic Semi-Gloss Latex Enamel 600 Line.
    - c. Semi-Gloss Finish: Benjamin Moore
      - 1) 1st Coat: Corotech Acrylic Block Filler V114 (43 g/L), LEED 2009.
      - 2) 2nd Coat: Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341 (71 g/L), LEED 2009.
- C. Metal, Galvanized: Ceilings and ductwork.
1. Dryfall Waterborne Topcoats:
    - a. Flat Finish: Sherwin Williams
      - 1) Prime Coat:
      - 2) 2nd and 3rd Coats: : Sherwin-Williams Pro Industrial Waterborne Acrylic Dryfall, B42-181 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - b. Flat Finish: Farrell Calhoun
      - 1) Prime Coat: Primer, latex, interior/exterior - FC 100% Acrylic All Purpose DTM Primer 5-56.
      - 2) 2nd and 3rd Coats: FC Tuff-Boy Waterborne Flat Dry Fall 999 Line.
    - c. Flat Finish: Benjamin Moore
      - 1) 1st Coat: Coronado Super Kote 5000 Dry Fall Latex Flat N110 (46 g/L), MPI # 118.
      - 2) 2nd and 3rd Coats: Coronado Super Kote 5000 Dry Fall Latex Flat N110 (46 g/L), MPI # 118.
- D. Metal: Structural steel columns, joists, trusses, beams, miscellaneous and ornamental iron, structural iron, and ferrous metal.
1. Latex Systems:
    - a. Semi-Gloss Finish: Sherwin Williams
      - 1) Prime Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
      - 2) 2nd and 3rd Coats: Sherwin-Williams Pro Industrial Acrylic Semi-Gloss, B66-650 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - b. Semi-Gloss Finish: Farrell Calhoun
      - 1) Prime Coat: Prime Coat: Primer, latex, interior/exterior - FC 100% Acrylic All Purpose DTM Primer 5-56.
      - 2) 2nd and 3rd Coats: FC 100% Acrylic Semi-Gloss Latex Enamel 600 Line.
    - c. Semi-Gloss Finish: Benjamin Moore
      - 1) Prime Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.

- 2) 2nd and 3rd Coats: Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341 (71 g/L), LEED 2009.
    2. Dryfall Waterborne Topcoat:
      - a. Flat Finish: Sherwin Williams
        - 1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
        - 2) 2nd and 3rd Coats: Sherwin-Williams Pro Industrial Waterborne Acrylic Dryfall, B42-181 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
      - b. Flat Finish: Farrell Calhoun
        - 1) Prime Coat: Primer, latex, interior/exterior - FC 100% Acrylic All Purpose DTM Primer 5-56.
        - 2) 2nd and 3rd Coats: Dry Fall, latex, interior, flat - FC Tuff-Boy Waterborne Flat Dry Fall 999 Line.
      - c. Flat Finish: Benjamin Moore
        - 1) Prime Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
        - 2) 2nd and 3rd Coats: Coronado Super Kote 5000 Dry Fall Latex Flat N110 (46 g/L), MPI # 118.
- E. Wood: Walls, ceilings, doors, and trim.
  1. Latex Systems:
    - a. Semi-Gloss Finish: Sherwin Williams
      - 1) Prime Coat: Sherwin-Williams Multi-Purpose Int/Ext. Primer/Sealer, B51-450.
      - 2) 2nd and 3rd Coats: Sherwin-Williams ProClassic Waterborne Acrylic Semi-Gloss, B31 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - b. Semi-Gloss Finish: Farrell Calhoun
      - 1) Prime Coat: FC Waterborne 100% Acrylic Enamel Undercoater 699.
      - 2) 2nd and 3rd Coats: Latex, interior, semi-gloss - FC 100% Acrylic Semi-Gloss Latex Enamel 600 Line.
    - c. Semi-Gloss Finish: Benjamin Moore
      - 1) Prime Coat: Benjamin Moore Fresh Start Multi-Purpose Primer N023 (44 g/L), MPI # 6, 17, X-Green 17, 39, 137, X-Green 137, LEED Credit, CHPS Certified.
      - 2) 2nd and 3rd Coats: Coronado Rust Scat Waterborne Acrylic Semi-Gloss 90 (134 g/L), MPI # 153, LEED Credit.
  2. Alkyd Systems, Water-Based:
    - a. Semi-Gloss Finish: Sherwin Williams
      - 1) Prime Coat: Sherwin-Williams Multi-Purpose Int/Ext. Primer/Sealer, B51-450.
      - 2) 2nd and 3rd Coats: Sherwin-Williams Pro Industrial Water Based Alkyd Urethane Enamel Semi-Gloss, B53-1150 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - b. Semi-Gloss Finish: Farrell Calhoun
      - 1) Prime Coat: Primer, alkyd, interior - FC Alkyd Enamel Undercoater 599.
      - 2) 2nd and 3rd Coats: Alkyd , interior, semi-gloss - FC Alkyd Semi-Gloss Enamel 500 Line.
    - c. Semi-Gloss Finish: Benjamin Moore
      - 1) Prime Coat: Benjamin Moore Fresh Start Multi-Purpose Primer N023 (44 g/L), MPI # 6, 17, X-Green 17, 39, 137, X-Green 137, LEED Credit, CHPS Certified.
      - 2) 2nd and 3rd Coats: Benjamin Moore Advance Waterborne Interior Alkyd Semi-Gloss 793 (48g/L), LEED 2009, LEED V4, CHPS Certified.
  3. Stain and Varnish System:
    - a. Satin Finish: Sherwin Williams

- 1) 1st Coat: Sherwin-Williams Minwax Performance Series Tintable Wood Stain 250 VOC: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
  - 2) 2nd and 3rd Coats: Sherwin-Williams Minwax Waterbased Oil-Modified Polyurethane: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
  - b. Satin Finish: Farrell Calhoun
    - 1) Stain Coat: Stain, waterborne, interior/exterior - FC Wood Kraft Waterborne Penetrating Wiping Stain 1500.
    - 2) 2nd and 3rd Coats: Waterborne varnish, interior, satin - FC Wood Kraft WB Acrylic Polyurethane Varnish 1192.
  - c. Satin Finish: Benjamin Moore
    - 1) 1st Coat: Lenmar Waterborne Interior Wiping Stain 1WB.1300 (240 g/L), MPI # 186 LEED Credit.
    - 2) 2nd Coat: Lenmar Waterborne Aqua-Plastic Urethane Satin, 1WB.1427 (335 g/L), MPI # 121, 128.
- F. Drywall: Walls, ceilings, gypsum board, and similar items.
1. Latex Systems:
    - a. Eg-Shel Finish: Sherwin Williams
      - 1) 1st Coat: Sherwin-Williams ProMar 200 Zero VOC Interior Latex Primer, B28W2600: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
      - 2) 2nd and 3rd Coat: Sherwin-Williams ProMar 200 Zero VOC Eg-Shel, B20-2600 Series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - b. Eg-Shel Finish: - Farrell Calhoun
      - 1) Prime Coat: Primer, latex, interior - FC Perfik-Seal Latex Wall Primer/Sealer 380.
      - 2) 2nd and 3rd Coat: FC Premium Latex Eggshell Enamel 370 Line
    - c. Eg-Shel Finish: - Benjamin Moore
      - 1) Prime Coat: Benjamin Moore Ultra Spec 500 Interior Latex Primer N534 (0 g/L), MPI # 50, X-Green 50, 149, X-Green 149, LEED 2009, LEED V4, CHPS Certified.
      - 2) 2nd and 3rd Coat: Benjamin Moore Ultra Spec 500 Latex Eggshell N538 (0 g/L), MPI # 52, X-Green 52, 145, X-Green 145, 139, X-Green 139, LEED 2009 LEED V4, CHPS Certified.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Do not begin application of coatings until substrates have been properly prepared and are ready to receive work as instructed by the product manufacturer.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Ensure that moisture-retaining substrates to receive coatings have moisture content within tolerances allowed by coating manufacturer, using moisture measurement techniques recommended by coating manufacturer. The maximum moisture content of substrates, when measured with an electronic moisture meter, are as follows:
  1. Concrete: 12 %
  2. Masonry (Clay and CMU): 12%
  3. Wood: 15%

- 4. Gypsum Board: 12%
- 5. Plaster: 12%

### 3.02 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations.
- B. Clean surfaces thoroughly and correct defects prior to application.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- D. Remove mildew from impervious surfaces by scrubbing with solution of water and bleach. Rinse with clean water and allow surface to dry.
- E. Concrete:
  - 1. Remove release agents, curing compounds, efflorescence, and chalk.
  - 2. Fill bug holes, air pockets, and other voids with cement patching compound.
- F. Masonry: Remove efflorescence and chalk.
- G. Gypsum Board: Fill minor defects with filler compound; sand smooth and remove dust prior to painting.
- H. Aluminum: Remove surface contamination and oil; wash with solvent according to SSPC-SP 1.
- I. Galvanized Surfaces:
  - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
  - 2. Prepare surface according to SSPC-SP 2.
- J. Ferrous Metal:
  - 1. Solvent clean according to SSPC-SP 1.
  - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Prime bare steel surfaces.
  - 3. Remove rust, loose mill scale, and other foreign substances using methods recommended by paint manufacturer and blast cleaning according to SSPC-SP 6. Protect from corrosion until coated.
- K. Wood: Remove dust, grit, and foreign matter. Scrape, sand, and spot prime knots and pitch streaks. Fill nail holes and imperfections with wood filler and sand smooth.

### 3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions.
- C. Apply coatings at spread rate required to achieve manufacturer's recommended dry film thickness.
- D. Regardless of number of coats specified, apply additional coats until complete hide is achieved.

### 3.04 PRIMING

- A. Apply primer to all surfaces unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.
- B. Primers specified in painting schedules may be omitted on items factory primed or factory finished items if acceptable to top coat manufacturers.

**3.05 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Clean surfaces immediately of overspray, splatter, and excess material.
- C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

**3.06 PROTECTION**

- A. Protect finished coatings from damage until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

**END OF SECTION**

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**SECTION 10 14 00  
SIGNAGE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Room and door signs.

**1.02 RELATED REQUIREMENTS**

- A. Section 26 51 00 - Interior Lighting: Exit signs required by code.

**1.03 REFERENCE STANDARDS**

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
  - 1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
  - 2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
  - 3. Submit for approval by Owner through Architect prior to fabrication.
- D. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.
- E. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.
- F. Manufacturer's Installation Instructions: Include installation templates and attachment devices.
- G. Manufacturer's Qualification Statement.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store tape adhesive at normal room temperature.

**1.07 FIELD CONDITIONS**

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

- B. Maintain this minimum temperature during and after installation of signs.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Flat Signs:
1. Best Sign Systems, Inc: [www.bestsigns.com/#sle](http://www.bestsigns.com/#sle).
  2. Inpro: [www.inprocorp.com/#sle](http://www.inprocorp.com/#sle).
  3. Mohawk Sign Systems, Inc: [www.mohawksign.com/#sle](http://www.mohawksign.com/#sle).
  4. Seton Identification Products: [www.seton.com/aec/#sle](http://www.seton.com/aec/#sle).
  5. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 SIGNAGE APPLICATIONS**

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
- B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
1. Sign Type: Flat signs with engraved panel media as specified.
  2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
  3. Character Height: 1 inch, unless otherwise indicated
  4. Sign Height: 2 inches, unless otherwise indicated.
  5. Office Doors: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide "window" section for replaceable occupant name.
  6. Conference and Meeting Rooms: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide "window" section with sliding "In Use/Vacant" indicator.
  7. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.
  8. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", room numbers to be determined later, and braille.

### **2.03 SIGN TYPES**

- A. Flat Signs: Signage media without frame.
1. Edges: Square.
  2. Corners: Square.
  3. Wall Mounting of One-Sided Signs: Tape adhesive.
- B. Color and Font: Unless otherwise indicated:
1. Character Font: Helvetica, Arial, or other sans serif font.
  2. Character Case: Upper case only.
  3. Background Color: To be selected.
  4. Character Color: Contrasting color.

### **2.04 ACCESSORIES**

- A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.
- B. Tape Adhesive: Double sided tape, permanent adhesive.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.

**3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.
- D. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

**END OF SECTION**

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**SECTION 10 14 14  
BUILDING PLAQUES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Provide one (1) cast plaque and related mounting hardware to be installed by Contractor.
- B. Provide logos for the Owner, Architect, and Contractor as part of the plaque layout. Owner, Architect and Contractor will provide a .jpg file of logo-mascot to Project Manager. Cost of any computer file conversion costs shall be paid by Contractor.

**1.02 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate Submit scaled shop drawings showing fabrication method, finish, anchoring methods, layout and installation method.
- C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in the schools name and registered with the manufacturer.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver cast plaque to project site in original shipping packaging.
- B. Store cast plaque under cover and elevated above grade.

**1.05 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide five year manufacturer warranty for cast plaque and mounting hardware. Complete forms in Owner's name and register with manufacturer.

**PART 2 PRODUCTS**

**2.01 CAST PLAQUE**

- A. Characteristics:
  - 1. Plaque Material: Bronze or Aluminum - to be selected
  - 2. Plaque Size: 24 inches tall by 16 inches wide.
  - 3. Letter Style: Helvetica Medium.
  - 4. Border Style: Style No. 504.
  - 5. Background Texture: Leatherette.
  - 6. Plaque Finish: To be selected.
  - 7. Plaque Mounting: Concealed mounting for masonry.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verification of Conditions: Verify that substrate surfaces are ready to receive work.

**3.02 INSTALLATION**

- A. Install in accordance with manufacturer's written instructions.

**3.03 TOLERANCES**

- A. Install cast plaque level, plumb, and at the height directed by Architect with surfaces free from dirtortion or other defects in appearances.

**3.04 CLEANING**

- A. After installation, clean soiled cast plaque surfaces according to the manufacturer's instructions.
- B. Protect installed cast plaque from damage until acceptance by the Owner.

**3.05 SCHEDULES**

- A. Design and lettering for cast plaque to be provided by Architect.

**END OF SECTION**

**SECTION 10 14 19  
EXTERIOR SIGNAGE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Dimensional letter signage.
- B. Illumination system.
- C. Custom metal signage.

**1.02 REFERENCE STANDARDS**

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. UL 879 - Electric Sign Components; Current Edition, Including All Revisions.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's product literature for each type of dimensional letter sign, indicating style, font, colors, locations, and overall dimensions of each sign.
- C. Shop Drawings:
  - 1. Include dimensions, locations, elevations, materials, text and graphic layout, and attachment details.
  - 2. Show locations of electrical service connections.
  - 3. Include diagrams for power, signal, and control wiring.
- D. Selection Samples: Where materials, colors, and finishes are not specified, submit two sets of selection charts or chips.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Package dimensional letter signs as required to prevent damage before installation.
- B. Store under cover and elevated above grade.

**1.06 FIELD CONDITIONS**

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain minimum ambient temperature during and after installation.

**PART 2 PRODUCTS**

**2.01 DIMENSIONAL LETTERS**

- A. Illuminated Metal Letters:
  - 1. Material: Stainless steel sheet, fabricated reverse channel.
  - 2. Thickness: 1/8 inch minimum.
  - 3. Letter Height: As indicated on drawings.
  - 4. Text and Typeface:
    - a. Character Font: Helvetica, Arial, or other sans serif font.
  - 5. Finish: Brushed, satin.

6. Color: As selected.
  7. Mounting: Concealed screws.
  8. Illumination System: Halo-lit reverse channel letters.
    - a. Provide products that are listed and labeled as complying with UL 879, where applicable.
    - b. Power: 120 V, 60 Hz, 1 phase, 15 A.
- B. Metal Letters:
1. Material: Stainless steel sheet, fabricated reverse channel.
  2. Thickness: 1/8 inch minimum.
  3. Letter Height: As indicated on drawings.
  4. Text and Typeface: Character Font: Helvetica, Arial, or other sans serif font.
  5. Finish: Brushed, satin.
  6. Color: As selected. Mounting:
  7. Concealed screws.

## **2.02 CUSTOM METAL SIGNAGE**

- A. Seal of the City of Brookland, Arkansas.
- B. Material: Stainless steel sheet, CNC or laser cut.
- C. Thickness: 1/8 inch minimum.
- D. Size: As indicated on drawings.
- E. Artwork and: To be provided by Owner.
- F. Finish: Brushed, satin.
- G. Color: As selected.
- H. Mounting: Concealed screws.

## **2.03 ACCESSORIES**

- A. Concealed Screws: Noncorroding metal; stainless steel, galvanized steel, chrome plated, or other.
- B. Electrical Components and Devices: Listed and labeled as defined in NFPA 70 by a qualified testing agency.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that electrical service is correctly sized and located to accommodate dimensional letter signs.
- C. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install with horizontal edges level.

**END OF SECTION**



**SECTION 10 21 13.19  
PLASTIC TOILET COMPARTMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Solid plastic toilet compartments.
- B. Urinal and vestibule screens.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Blocking and supports.
- B. Section 10 28 00 - Toilet, Bath, and Laundry Accessories.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on panel construction, hardware, and accessories.
- C. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
- D. Samples: Submit two samples of partition panels, 4 by 4 inch in size illustrating panel finish, color, and sheen.
- E. Manufacturer's Installation Instructions: Indicate special procedures.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Solid Plastic Toilet Compartments:
  - 1. All American Metal Corp - AAMCO: [www.allamericanmetal.com/#sle](http://www.allamericanmetal.com/#sle).
  - 2. Inpro: [www.inprocorp.com/#sle](http://www.inprocorp.com/#sle).
  - 3. Partition Systems International of South Carolina: [www.psisc.com/#sle](http://www.psisc.com/#sle).
  - 4. Scranton Products: [www.scrantonproducts.com/#sle](http://www.scrantonproducts.com/#sle).
  - 5. Substitutions: Section 01 60 00 - Product Requirements.

**2.02 PLASTIC TOILET COMPARTMENTS**

- A. Solid Plastic Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE); floor-mounted headrail-braced.
  - 1. Color: To be selected.
  - 2. Doors:
    - a. Thickness: 1 inch.
    - b. Width: 24 inch.
    - c. Width for Handicapped Use: 36 inch, out-swinging.
    - d. Height: 55 inch.
  - 3. Panels:
    - a. Thickness: 1 inch.
    - b. Height: 55 inch.
  - 4. Pilasters:

- a. Thickness: 1 inch.
- b. Width: As required to fit space; minimum 3 inch.
- 5. Screens: Without doors; to match compartments; mounted to wall with two panel brackets with vertical support/bracing same as compartments.

### **2.03 ACCESSORIES**

- A. Pilaster Shoes: Stainless steel, satin finish, 3 inches high; concealing floor fastenings.
- B. Head Rails: Extruded aluminum, anti-grip profile.
- C. Wall Brackets: Stainless steel; manufacturer's standard type for conditions indicated on drawings.
- D. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
- E. Door Hardware: Stainless steel, manufacturer's standard finish.
  - 1. Door Latch: Slide type with exterior emergency access feature.
  - 2. Door Strike and Keeper with Rubber Bumper: Mount on pilaster in alignment with door latch.
  - 3. Provide door pull for outswinging doors.
- F. Coat Hook: One per compartment, mounted on door.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify correct spacing of and between plumbing fixtures.
- C. Verify correct location of built-in framing, anchorage, and bracing.

### **3.02 INSTALLATION**

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.

### **3.03 TOLERANCES**

- A. Maximum Variation From True Position: 1/4 inch.
- B. Maximum Variation From Plumb: 1/8 inch.

### **3.04 ADJUSTING**

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.

**END OF SECTION**

**SECTION 10 26 00  
WALL PROTECTION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Corner guards.

**1.02 REFERENCE STANDARDS**

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate physical dimensions, features, wall mounting brackets with mounted measurements, anchorage details, and rough-in measurements.
- C. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver wall and door protection items in original, undamaged protective packaging. Label items to designate installation locations.
- B. Protect work from moisture damage.
- C. Store products in either horizontal or vertical position, in compliance with manufacturer's instructions.

**1.05 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Corner Guards:
  - 1. Construction Specialties, Inc: [www.c-sgroup.com/#sle](http://www.c-sgroup.com/#sle).
  - 2. Inpro: [www.inprocorp.com/#sle](http://www.inprocorp.com/#sle).
  - 3. Nystrom, Inc: [www.nystrom.com/#sle](http://www.nystrom.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Protective Wall Covering:
  - 1. Construction Specialties, Inc: [www.c-sgroup.com/#sle](http://www.c-sgroup.com/#sle).
  - 2. Inpro: [www.inprocorp.com/#sle](http://www.inprocorp.com/#sle).
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 PRODUCT TYPES**

- A. Corner Guards - Surface Mounted:
  - 1. Material: High impact vinyl with full height extruded aluminum retainer.
  - 2. Surface Burning Characteristics: Provide assemblies with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
  - 3. Width of Wings: 3 inches.
  - 4. Corner: Square.
  - 5. Color: As selected from manufacturer's standard colors.

6. Length: One piece.

**2.03 FABRICATION**

- A. Fabricate components with tight joints, corners and seams.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.  
B. Verify that field measurements are as indicated on drawings.  
C. Start of installation constitutes acceptance of project conditions.

**3.02 INSTALLATION**

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to supporting construction.  
B. Position corner guard 4 inches above finished floor to forty inches high.

**END OF SECTION**

**SECTION 10 28 00**  
**TOILET, BATH, AND LAUNDRY ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Commercial toilet accessories.
- B. Diaper changing stations.
- C. Utility room accessories.

**1.02 REFERENCE STANDARDS**

- A. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2015a (Reapproved 2019).
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- D. ASTM C1036 - Standard Specification for Flat Glass; 2016.
- E. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2018.
- F. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2004, with Editorial Revision (2016).

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. Samples: Submit two samples of each accessory, illustrating color and finish.
- D. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Commercial Toilet, Shower, and Bath Accessories:
  - 1. American Specialties, Inc: [www.americanspecialties.com/#sle](http://www.americanspecialties.com/#sle).
  - 2. Bradley Corporation: [www.bradleycorp.com/#sle](http://www.bradleycorp.com/#sle).
  - 3. Bobrick: [www.bobrick.com](http://www.bobrick.com).
  - 4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Diaper Changing Stations:
  - 1. American Specialties, Inc: [www.americanspecialties.com/#sle](http://www.americanspecialties.com/#sle).
  - 2. Bradley Corporation: [www.bradleycorp.com/#sle](http://www.bradleycorp.com/#sle).
  - 3. Koala Kare Products; by Bobrick: [www.koalabear.com/#sle](http://www.koalabear.com/#sle).
  - 4. Substitutions: 01 60 00 - Product Requirements.

- C. Provide products of each category type by single manufacturer.

## 2.02 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
- B. Keys: Provide two keys for each accessory to Owner; master key lockable accessories.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.
- E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- F. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.
- G. Adhesive: Two component epoxy type, waterproof.
- H. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

## 2.03 FINISHES

- A. Stainless Steel: Satin finish, unless otherwise noted.

## 2.04 COMMERCIAL TOILET ACCESSORIES

- A. Toilet Paper Dispenser: Twin jumbo roll roll, surface mounted.
- B. Paper Towel Dispenser: Electric, roll paper type.
  - 1. Cover: Stainless steel.
  - 2. Paper Discharge: Touchless automatic.
  - 3. Capacity: 6 inch diameter roll.
  - 4. Mounting: Surface mounted.
  - 5. Power: Battery operated.
  - 6. Refill Indicator: Illuminated refill indicator.
- C. Waste Receptacle: Stainless steel, freestanding style with swing top.
  - 1. Liner: Removable rigid molded plastic receptacle.
  - 2. Minimum capacity: 10 gallons.
- D. Automated Soap Dispenser: Liquid soap dispenser, wall-mounted, with stainless steel cover and window to gauge soap level, tumbler lock.
  - 1. Minimum Capacity: 48 ounces.
- E. Grab Bars: Stainless steel, textured surface.
  - 1. Standard Duty Grab Bars:
    - a. Push/Pull Point Load: 250 pound-force, minimum.
    - b. Dimensions: 1-1/4 inch outside diameter, minimum 0.05 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
    - c. Finish: Satin.
    - d. Length and Configuration: As indicated on drawings.
- F. Sanitary Napkin Disposal Unit: Stainless steel, surface-mounted, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.

## **2.05 DIAPER CHANGING STATIONS**

- A. Diaper Changing Station: Wall-mounted folding diaper changing station for use in commercial toilet facilities, meeting or exceeding ASTM F2285.
  - 1. Material: Polyethylene.
  - 2. Mounting: Surface.
  - 3. Color: As selected.
  - 4. Minimum Rated Load: 250 pounds.

## **2.06 UTILITY ROOM ACCESSORIES**

- A. Combination Utility Shelf/Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, with 1/2 inch returned edges, 0.06 inch steel wall brackets.
  - 1. Drying rod: Stainless steel, 1/4 inch diameter.
  - 2. Hooks: Two, 0.06 inch stainless steel rag hooks at shelf front.
  - 3. Mop/broom holders: Three spring-loaded rubber cam holders at shelf front.
  - 4. Length: 36 inches.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. Verify that field measurements are as indicated on drawings.

### **3.02 INSTALLATION**

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
  - 1. Grab Bars: As indicated on drawings.

### **3.03 PROTECTION**

- A. Protect installed accessories from damage due to subsequent construction operations.

**END OF SECTION**

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**SECTION 10 44 00  
FIRE PROTECTION SPECIALTIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.
- B. Section 09 91 23 - Interior Painting: Field paint finish.

**1.03 REFERENCE STANDARDS**

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (Reapproved 2017).
- B. NFPA 10 - Standard for Portable Fire Extinguishers; 2017, with Errata (2018).

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide extinguisher operational features.
- C. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.
- D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

**1.05 FIELD CONDITIONS**

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Fire Extinguishers:
  - 1. Activar Construction Products Group, Inc. - JL Industries: [www.activarcpg.com/#sle](http://www.activarcpg.com/#sle).
  - 2. Ansul, a Tyco Business: [www.ansul.com/#sle](http://www.ansul.com/#sle).
  - 3. Kidde, a unit of United Technologies Corp: [www.kidde.com/#sle](http://www.kidde.com/#sle).
  - 4. Nystrom, Inc: [www.nystrom.com/#sle](http://www.nystrom.com/#sle).
  - 5. Oval Brand Fire Products: [www.ovalfireproducts.com/#sle](http://www.ovalfireproducts.com/#sle).
  - 6. Potter-Roemer: [www.potterroemer.com/#sle](http://www.potterroemer.com/#sle).
  - 7. Pyro-Chem, a Tyco Business: [www.pyrochem.com/#sle](http://www.pyrochem.com/#sle).
  - 8. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Fire Extinguisher Cabinets and Accessories:
  - 1. Activar Construction Products Group, Inc. - JL Industries: [www.activarcpg.com/#sle](http://www.activarcpg.com/#sle).
  - 2. Kidde, a unit of United Technologies Corp: [www.kidde.com/#sle](http://www.kidde.com/#sle).
  - 3. Larsen's Manufacturing Co: [www.larsensmfg.com/#sle](http://www.larsensmfg.com/#sle).

4. Nystrom, Inc: [www.nystrom.com/#sle](http://www.nystrom.com/#sle).
5. Oval Brand Fire Products; Cabinets for Low Profile Extinguishers:  
[www.ovalfireproducts.com/#sle](http://www.ovalfireproducts.com/#sle).
6. Potter-Roemer: [www.potterroemer.com/#sle](http://www.potterroemer.com/#sle).
7. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.02 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
  1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
- B. Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
  1. Class: B:C type.
  2. Size: 10 pound.
  3. Size and classification as scheduled.
  4. Finish: Baked enamel, color as selected.
  5. Temperature range: Minus 40 degrees F to 120 degrees F.

## 2.03 FIRE EXTINGUISHER CABINETS

- A. Fire Rating: Listed and labeled in accordance with ASTM E814 requirements for fire resistance rating of walls where being installed.
- B. Cabinet Construction: Non-fire rated.
  1. Formed primed steel sheet; 0.036 inch thick base metal.
- C. Cabinet Configuration: Semi-recessed type.
  1. Size to accommodate accessories.
  2. Projected Trim: As indicated on drawings, or if not indicated, to be selected.
  3. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.
- D. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180 degree opening with two butt hinges.
- E. Door Glazing: Tempered glass, clear, 1/8 inch thick, and set in resilient channel glazing gasket.
- F. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.
- G. Fabrication: Weld, fill, and grind components smooth.
- H. Finish of Cabinet Exterior Trim and Door: Primed for field paint finish.
- I. Finish of Cabinet Interior: White colored enamel.

## 2.04 ACCESSORIES

- A. Lettering: FIRE EXTINGUISHER decal, or vinyl self-adhering, pre-spaced black lettering in accordance with authorities having jurisdiction (AHJ).

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify rough openings for cabinet are correctly sized and located.

### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

- B. Secure rigidly in place.
- C. Place extinguishers in cabinets.
- D. Position cabinet signage at locations where indicated on drawings or as directed by AHJ.

**END OF SECTION**

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**SECTION 10 73 16.13  
METAL CANOPIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Roll-formed aluminum overhead hanger rod style canopy.

**1.02 REFERENCE STANDARDS**

- A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit product data sheets, including material descriptions and finishes, and preparation instructions and recommendations.
- C. Shop Drawings: Prior to commencement of fabrication, submit detailed shop drawings, showing profiles, sections of components, finishes, and fastening details.
- D. Design Data: Submit comprehensive structural analysis of design for the specified loads. Stamp and sign calculations by professional engineer.
- E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

**1.04 QUALITY ASSURANCE**

- A. Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
  - 1. Comply with applicable code for submission of design calculations as required for acquiring permits.
  - 2. Cooperate with regulatory agency or authorities having jurisdiction (AHJ), and provide data as requested.
  - 3. Determine if specific load requirements have been established for canopies and if stamped calculations are required for location in which canopy is installed.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to project site ready for erection.
- B. Package using methods that prevent damage during shipping and storage on site.
- C. Store materials under cover and elevated above grade.

**1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Metal Canopies: Correct defective work within a two year period after Date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Metal Canopies:
  - 1. Basis of Design: Model Lumishade as manufactured by Mapes Canopies; 1-888-273-1132; www.mapes.com.
  - 2. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.02 METAL CANOPIES

- A. Fabricated Metal Canopy
  - 1. Pre-engineered system complying with ASTM E2950.
  - 2. Design and fabricate metal canopy system to resist wind, snow, live, and seismic loads without failure, damage, or permanent deflection in accordance with ASCE 7:
    - a. Loads: As indicated on drawings.
  - 3. Thermal Movement: Design canopy system to accommodate thermal movement caused by ambient temperature range of 120 degrees F and surface temperature range of 180 degrees F without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects on assembly components.
- B. Configuration: Column layout, canopy clearance, and roof covering design as indicated on drawings.

## 2.03 COMPONENTS

- A. Decking shall consist of an interlocking roll-formed 2 1/2 W style pan (minimum .032 aluminum.)
- B. Intermediate framing members shall be extruded aluminum, alloy 6063-T6, in profile and thickness shown in current Mapes brochures.
- C. Hanger rods and attachment hardware shall be powder coated.
- D. Fascia shall be standard 8" extruded J style (minimum .125 aluminum).
- E. Finish: Two Coat Kynar Color to be selected from Premium Colors.

## 2.04 FABRICATION

- A. Provide a complete system ready for erection at project site.
- B. Shop fabricate to the greatest extent possible; disassemble if necessary for shipping.
- C. All connections shall be mechanically assembled utilizing 3/16 fasteners with a minimum shear stress of 350 lb. Pre-welded or factory-welded connections are not acceptable.
- D. Decking shall be designed with interlocking roll-formed aluminum members.
- E. Concealed drainage. Water shall drain from covered surfaces into intermediate trough and be directed to either the front for front drainage or to the rear for ground level discharge via one or more designated downspouts.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Examine substrates and site area for conditions that might prevent satisfactory installation.
- B. Verify that bearing surfaces are ready to receive this work.
- C. Do not proceed with installation until all conditions are satisfactory.

### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions and shop drawings. Particular attention should be given to protecting the finish during handling and erection.
- B. Confirm that surrounding area is ready for the canopy installation.
- C. Installer shall confirm dimensions and elevations to be as shown on drawings provided by the manufacturer.

- D. Erection shall be performed by an approved installer and scheduled after all concrete, masonry and roofing in the area is completed.
- E. Touch-up damaged finish coating using material provided by manufacturer to match original coating.

**3.03 TOLERANCES**

- A. Maximum Variation from Level: Plus/Minus 1/8 inch.

**3.04 CLEANING**

- A. Clean surfaces of dust and debris; follow manufacturer's cleaning instructions for the finish used.

**3.05 PROTECTION**

- A. Protect canopy after installation to prevent damage due to other work until Date of Substantial Completion.

**END OF SECTION**

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**SECTION 10 75 00  
FLAGPOLES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Aluminum Flagpoles.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete base and foundation construction.

**1.03 REFERENCE STANDARDS**

- A. AASHTO M 36 - Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains; 2016.
- B. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube; 2016.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on pole, accessories, and configurations.
- C. Shop Drawings: Indicate detailed dimensions, base details, anchor requirements, and imposed loads.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Spiral wrap flagpole with protective covering and pack in protective shipping tubes or containers.
- B. Protect flagpole and accessories from damage or moisture.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Flagpoles:
  - 1. American Flagpole: [www.americanflagpole.com/#sle](http://www.americanflagpole.com/#sle).
  - 2. Concord Industries, Inc: [www.concordindustries.com/#sle](http://www.concordindustries.com/#sle).
  - 3. Pole-Tech Co, Inc: [www.poletech.com/#sle](http://www.polettech.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 FLAGPOLES**

- A. Flagpoles: Designed in accordance with NAAMM FP 1001
  - 1. Material: Aluminum.
  - 2. Design: Cone tapered.
  - 3. Mounting: Ground mounted type.
  - 4. Nominal Height: 30 ft; measured from nominal ground elevation.
  - 5. Halyard: External type .

**2.03 POLE MATERIALS**

- A. Aluminum: ASTM B241/B241M , 6063 alloy , T6 temper.

**2.04 ACCESSORIES**

- A. Finial Ball: Stainless steel, 6 inch diameter.
- B. Truck Assembly: Cast aluminum; revolving, stainless steel ball bearings, non-fouling.

- C. Flag: U.S. Flag design, 5 ft by 8 ft size, nylon fabric, brass grommets, hemmed edges.
- D. Cleats: 9 inch size, aluminum with galvanized steel fastenings, two per halyard.
- E. Halyard: 5/16 inch diameter polypropylene, braided, white.

#### **2.05 MOUNTING COMPONENTS**

- A. Foundation Tube Sleeve: AASHTO M 36, corrugated 16 gauge, 0.0598 inch steel, galvanized, depth of as indicated.

#### **2.06 FINISHING**

- A. Aluminum: Clear Anodized.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that concrete foundation is ready to receive work and dimensions are as indicated on shop drawings.

#### **3.02 PREPARATION**

- A. Coat metal sleeve surfaces below grade and surfaces in contact with dissimilar materials with asphaltic paint.

#### **3.03 INSTALLATION**

- A. Install flagpole , base assembly, and fittings in accordance with manufacturer's instructions.

#### **3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1 inch.

#### **3.05 ADJUSTING**

- A. Adjust operating devices so that halyard and flag function smoothly.

**END OF SECTION**

**SECTION 11 30 13  
RESIDENTIAL APPLIANCES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Kitchen appliances.

**1.02 RELATED REQUIREMENTS**

- A. Section 22 10 05 - Plumbing Piping: Plumbing connections for appliances.
- B. Section 26 05 83 - Wiring Connections: Electrical connections for appliances.

**1.03 REFERENCE STANDARDS**

- A. UL (DIR) - Online Certifications Directory; Current Edition.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.
- C. Copies of Warranties: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Electric Appliances: Listed and labeled by UL (DIR) and complying with NEMA Standards (National Electrical Manufacturers Association).

**1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide five (5) year manufacturer warranty on refrigeration system of refrigerators.
- C. Provide ten (10) year manufacturer warranty on magnetron tube of microwave ovens.
- D. Provide ten (10) year manufacturer warranty on tub and door liner of dishwashers.

**PART 2 PRODUCTS**

**2.01 KITCHEN APPLIANCES**

- A. Provide Equipment Eligible for Energy Star Rating: Energy Star Rated.
  - B. Refrigerator, Model GSS25GGP/GYP/GMP: Free-standing, side-by-side, and frost-free.
    - 1. Capacity: Total minimum storage of 25.3 cubic ft; minimum 20 percent freezer capacity.
    - 2. Energy Usage: Minimum 20 percent more energy efficient than energy efficiency standards set by U.S. Department of Energy (DOE).
    - 3. Features: Include glass shelves, automatic icemaker, and light in freezer compartment.
    - 4. Exterior Finish: Stainless steel.
    - 5. Manufacturers:
      - a. Substitutions: See Section 01 60 00 - Product Requirements.
  - C. Refrigerator, Model GSS25GSH/GMH: Free-standing, side-by-side, and frost-free.
    - 1. Capacity: Total minimum storage of 25.3 cubic ft; minimum 20 percent freezer capacity.
    - 2. Energy Usage: Minimum 20 percent more energy efficient than energy efficiency standards set by U.S. Department of Energy (DOE).
-

3. Features: Include glass shelves, automatic icemaker, light in freezer compartment, and in-door water and ice dispenser.
4. Exterior Finish: Stainless steel.
5. Manufacturers:
  - a. Frigidaire Home Products; \_\_\_\_: [www.frigidaire.com/#sle](http://www.frigidaire.com/#sle).
  - b. GE Appliances; GE 25.3 CU. FT. SIDE-BY-SIDE REFRIGERATOR WITH DISPENSER: [www.geappliances.com/#sle](http://www.geappliances.com/#sle).
  - c. \_\_\_\_\_.
  - d. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Microwave, Model GE-PES7227SLSS: Countertop.
  1. Capacity: 2.2 cubic ft.
  2. Power: 1100 watts.
  3. Features: Include turntable, cooktop light, and 2-speed exhaust fan.
  4. Exterior Finish: Stainless.
  5. Manufacturers:
    - a. GE Appliances: [www.geappliances.com/#sle](http://www.geappliances.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Dishwasher, Model GE-GDT226SSLSS: Undercounter.
  1. Controls: Solid state electronic.
  2. Wash Levels: Two (2).
  3. Cycles: Six (6), including normal, rinse and hold, and short.
  4. Features: Include rinse aid dispenser.
  5. Finish: Stainless steel.
  6. Manufacturers:
    - a. GE Appliances: [www.geappliances.com/#sle](http://www.geappliances.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify utility rough-ins are provided and correctly located.

#### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Anchor built-in equipment in place.

#### **3.03 ADJUSTING**

- A. Adjust equipment to provide efficient operation.

#### **3.04 CLEANING**

- A. Remove packing materials from equipment and properly discard.
- B. Wash and clean equipment.

**END OF SECTION**

**SECTION 12 25 13  
WINDOW ROLLER SHADES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Roller shades, manual operation and accessories.
- B. Shade fabric.

**1.02 RELATED SECTIONS**

- A. Section 06100 - Rough Carpentry: Wood blocking and grounds for mounting roller shades and accessories.
- B. Section 09260 - Gypsum Board Assemblies: Coordination with gypsum board assemblies for installation of shade pockets, closures and related accessories.
- C. Section 09510 - Acoustical Ceilings: Coordination with acoustical ceiling systems for installation of shade pockets, closures and related accessories.

**1.03 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM G21 and E 2180 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- B. Cradle to Cradle Products Innovation Institute (C2C):
  - 1. C2C (DIR) - C2C Certified Products Registry.
- C. National Fire Protection Association (NFPA):
  - 1. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.
- D. Window Covering Manufacturers Association (WCMA):
  - 1. WCMA A100.1 - Safety of Window Covering Products; 2018.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: One week prior to commencing work related to this section. Require attendance of all affected installers.
- B. Sequencing:
  - 1. Do not fabricate shades until field dimensions for each opening have been taken with finished conditions in place. "Hold to" dimensions are not acceptable.
  - 2. Do not install shades until final surface finishes and painting are complete.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Bid Submittal: Information Required with Submittal of Bid: In order to evaluate proposals for integrated lighting control and window shade systems, the Architect requires the following information be submitted prior to the award of the system.
  - 1. Bid proposal shall be accompanied with a document that notes all deviations from these specifications on a line-by-line basis.
- C. Product Data: Manufacturer's catalog pages and data sheets for products specified including materials, finishes, dimensions, profiles, mountings, and accessories.
  - 1. Preparation instructions and recommendations.
  - 2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes, accessories, and operating instructions.
  - 3. Storage and handling requirements and recommendations.

4. Mounting details and installation methods.
  5. Manufacturer's Instructions: Include storage, handling, protection, examination, preparation, and installation.
  6. Project Record Documents: Record actual locations of control system components and show interconnecting wiring.
  7. Operation and Maintenance Data: Component list with part numbers, and operation and maintenance instructions.
- D. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, and relationship to adjacent work.
1. Prepare shop drawings on AutoCad or MicroStation format using base sheets provided electronically by the Architect.
  2. Provide location plan showing all manual shade control locations. Cross-reference furniture plans for optimal positioning of chains.
  3. Provide elevation drawings showing shade band layout. Indicate any necessary seam or batten locations, and align with horizontal mullions where possible.
- E. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.
- F. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements.
1. Shadecloth Sample: Mark face of material to indicate interior faces.
    - a. Test reports indicating compliance with specified fabric properties.
    - b. Verification Samples: 6 inches (150 mm) square, representing actual materials, color and pattern.
- G. Maintenance Data: Bill of materials for all components with part numbers. Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.
- H. Warranty: Provide manufacturer's warranty documents as specified in this Section.

#### **1.06 QUALITY ASSURANCE**

- A. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.
- B. Manufacturer Qualifications: Obtain roller shades system through one source from a single manufacturer with a minimum of ten years experience and minimum of five projects of similar scope and size in manufacturing products comparable to those specified in this section.
- C. Installer for Roller Shade System - Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.
  1. Requirements for Roller Shade Installer/Contractor:
    - a. Roller Shade Hardware, shade fabric and all related controls shall be furnished and installed as a complete assembly.
- D. Product Listing Organization Qualifications: Organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.
- E. Fire-Test-Response Characteristics: Passes NFPA 701 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.
- F. ShadeCloth Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC9644 and ATCC9645, and E2180.

- G. ShadeCloth Cleanability and Disinfecting: ShadeCloth must meet cleanability and disinfecting requirements via 3rd party testing to comply with BIFMA HCF 8.1-2014 standards using chemical solutions compliant with EPA guidelines for use against COVID-19.
- H. Environmental Certification: Submit written certification from the manufacturer, including third party evaluation, recycling characteristics, and perpetual use certification as specified. Initial submittals, which do not include the Environmental Certification will be rejected. Materials that are simply 'PVC free' without identifying their inputs shall not qualify as meeting the intent of this specification and shall be rejected.
- I. Third Party Evaluation: Provide documentation stating the shade cloth has undergone third party evaluation for all chemical inputs, down to a scale of 100 parts per million, that have been evaluated for human and environmental safety. Identify any and all inputs, which are known to be carcinogenic, mutagenic, teratogenic, reproductively toxic, or endocrine disrupting. Also identify items that are toxic to aquatic systems, contain heavy metals, or organohalogens. The material shall contain no inputs that are known problems to human or environmental health per the above major criteria, except for an input that is required to meet local fire codes.
- J. Recycling Characteristics: Provide documentation that the shade cloth can, and is part of a closed loop of perpetual use and not be required to be down cycled, incinerated or otherwise thrown away. Scrap material can be sent back to the mill for reprocessing and recycling into the same quality yarn and woven into new material, without down cycling. Certify that this process is currently underway and will be utilized for this project.
- K. Perpetual Use Certification: Certify that at the end of the useful life of the shade cloth, that the material can be sent back to the manufacturer for recapture as part of a closed loop of perpetual use and that the material can and will be reconstituted into new yarn, for weaving into new shade cloth. Provide information on each shade band indicating that the shade band can be sent back to the manufacturer for this purpose.

#### **1.07 MOCK-UP**

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in Window Treatment Schedule.
- B. Store and handle products per manufacturer's recommendations.

#### **1.09 PROJECT CONDITIONS**

- A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

#### **1.10 WARRANTY**

- A. Roller Shade Hardware and Chain Warranty: Manufacturer's standard non-depreciating, transferrable warranty for interior shading.
  - 1. Shade Hardware – 10 years unless otherwise indicated:
    - a. Mecho/5 and Mecho/5x with ThermoVeil, EuroTwill, Soho, Equinox, Midnite, Chelsea, or Classic Blackout shade fabric: 25-years.
    - b. Mecho/7 including bead chain with ThermoVeil, EuroTwill, Soho, Equinox, Midnite, Chelsea, or Classic Blackout shade fabric: 25-years.
  - 2. All Mecho Shadecloth: Manufacturer's standard 25-year warranty.
  - 3. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas, which are deemed owners

responsibility.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Acceptable Manufacturer for Window Shade Control System as basis of design, performance and warranty: Mecho, which is located at: 42-03 35th St.; Long Island City, NY 11101; ASD Tel: 718-729-2020; Fax: 718-729-2941; Email: marketing@mechoshade.com; Web: www.mechoshade.com. For your local Mecho rep: Wayne Jaques, President, Arkansas Shades, Blinds & Shutters Inc., (501) 812 - 4858
- B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

### **2.02 APPLICATIONS/SCOPE**

- A. Roller Shade Schedule:
  - 1. Manual operating, chain drive, sunscreen roller and room darkening opaque double roller shades and related mounting systems and accessories as indicated on drawings.
  - 2. CPSC Compliance: All manually operated window coverings with accessible cords, chains, continuous loop cords, etc. shall meet all current Federally mandated CPSC (Consumer Products Safety Commission) safety standards at time of manufacturing. Depending on the product type, additional hardware components may be required and added to meet new regulatory compliant anti-ligature requirements.
    - a. ROLLER SHADES, MANUAL OPERATION AND ACCESSORIES
- B. Shade System; General:
  - 1. Components capable of being removed or adjusted without removing mounted shade brackets, or cassette support channel.
  - 2. Smoothly operation raising or lowering shades.
- C. Basis of Design: UrbanShade, manual operation. As manufactured by Mecho. Fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and accessories.
  - 1. Shade Type: Double roller.
  - 2. Drop Position: Regular. Fabric falls off roller tube, close to glass.
  - 3. Size (WxH): Full height and width of individual window openings.
  - 4. Fabric: As indicated under Shade Fabric article.
  - 5. Brackets and Mounting Hardware: Stamped steel. As recommended by manufacturer for mounting indicated accommodating shade fabric roll-up size and weight.
    - a. Double Roller Brackets: Configured for light-filtering and room-darkening shades in one opening.
      - 1) Light-Filtering Fabric: Room-side of opening.
      - 2) Room-Darkening Fabric: Glass-side of opening.
  - 6. Roller Tubes: Extruded aluminum. Capable of being removed and reinstalled without affecting roller shade limit adjustments.
    - a. Size: As recommended by manufacturer; for installation conditions, span, and weight of shades.
    - b. Fabric Attachment: Extruded channel in tube accepts vinyl spline welded to fabric edge.
      - 1) Shade Band: Removable and replaceable without removing roller tube from brackets or inserting spline from the side of the roller tube.
  - 7. Hembars: Maintains bottom of shade straight and flat.
    - a. Style: Full wrap fabric covered bottom bar, flat profile with heat sealed closed ends.
  - 8. Manual Operation:



- a. Clutch Operator: Manufacturer's standard material and design integrated with bracket/brake assembly.
    - 1) Brake Assembly: Mounted on a low-friction plastic hub with wrapped spring clutch.
      - (a) Brake must withstand minimum pull force of 25 lbs (12 kg) in stopped position.
    - 2) Clutch/Brake Mounting: On support brackets, independent of roller tube components.
  - b. Drive Chain: Continuous loop beaded ball chain. Upper and lower limit stops.
    - 1) Breaking Force: 45 lbf (200 N) minimum.
    - 2) Chain Retainer per WCMA A100.1: Tensioning device.
  - c. Lift Assist Mechanism: Contained in idler end of roller tube. When hanging weights exceed roller tube weight limits. Manufacturer's standard.
9. Accessories:
- a. Fascia: Removable extruded aluminum. Size as required to conceal shade mounting. Attachable to brackets without exposed fasteners.
    - 1) Finish: Baked enamel.
      - (a) Color: To be determine.
    - 2) Profile: Radiused.
    - 3) Configuration: Captured, fascia stops at captured bracket end.

### 2.03 ROLLER SHADE FABRICATION

- A. Field measure finished openings prior to ordering or fabrication.
- B. Openings Requiring Continuous Multiple Shade Units with Separate Rollers: Locate roller joints at window mullion centers; butt rollers end-to-end.

### 2.04 SHADE FABRIC

- A. Basis of Design: Shade fabric as manufactured by MechoShade Systems LLC.
  - 1. Solar Shade cloths:
    - a. Fabric: Soho: 1600 series. 3 percent open. 2 x 2 basket-weave pattern of fine yarn PVC and polyester blend, also 126 inches (3200 mm) wide.
      - 1) NRC Rating: 0.25.
      - 2) SAA Rating: 0.29.
      - 3) Low-Emitting Material Certification: Greenguard Gold certified and listed in UL (GGG).
      - 4) Health Product Declaration (HPD): Published declaration with full disclosure of known hazards.
      - 5) Environmental Product Declaration (EPD): Published disclosure of product's environmental impacts based on a full Life Cycle Assessment (LCA). Manufacturer must have EPD certification by independent 3rd party evaluation service.
  - 2. Blackout Shade cloths:
    - a. Fabric: Chelsea: 0250 series. Opaque. Solid graphite-colored backing. PVC-Free.
      - 1) Low-Emitting Material Certification: Greenguard Gold certified and listed in UL (GGG).
      - 2) Health Product Declaration (HPD): Published declaration with full disclosure of known hazards.
      - 3) Cradle to Cradle Material Health Certificate:
        - (a) Achievement Level: Silver.

- 4) Environmental Product Declaration (EPD): Published disclosure of product's environmental impacts based on a full Life Cycle Assessment (LCA).  
Manufacturer must have EPD certification by independent 3rd party evaluation service.
- b. Color: Selected from manufacturer's standard colors.
3. Performance Requirements:
  - a. Flammability per NFPA 701: Pass. Large or small scale test.
  - b. Fungal Resistance: No growth when tested per ASTM G21.
  - c. Cleanability and Disinfecting: ShadeCloth must meet cleanability and disinfecting requirements via 3rd party testing to comply with BIFMA HCF 8.1-2014 standards using chemical solutions compliant with EPA guidelines for use against COVID-19.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Start of installation shall be considered acceptance of substrates.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.

#### **3.03 INSTALLATION**

- A. Contractor Furnish and Install Responsibilities:
  1. Window Covering Contractor (WC) shall provide an on site, Project Manager, and shall be present for all related jobsite scheduling meetings.
  2. WC shall supervise the roller shade installation, and setting of intermediate stops of all shades.
  3. WC shall be responsible for field inspection on an area-by- area and floor-by-floor basis during construction to confirm proper mounting conditions per approved shop drawings.
  4. Verification of Conditions: examine the areas to receive the work and the conditions under which the work would be performed and notify General Contractor and Owner of conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected. Commencement of installation shall constitute acceptance of substrate conditions by the installer.
  5. WC shall provide accurate to 0.0625" inch (1.5875mm); field measurements for custom shade fabrication on the Roller Shades manufacturers input forms.
  6. WC Installer shall install roller shades level, plumb, square, and true according to manufacturer's written instructions, and as specified here in. Blocking for roller shades installed under the contract of the interior General Contractor shall be installed plumb, level, and fitted to window mullion as per interior architect's design documents and in accordance with industry standard tolerances. The horizontal surface of the shade pocket shall not be out-of-level more than 0.625" (15.875mm) over 20 linear feet (6.096 meters)
  7. Shades shall be located so the shade band is not closer than 2 inches (50 mm) to the interior face of the glass. Allow proper clearances for window operation hardware.
  8. Adjust, align and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

9. Installer shall set Upper and Lower limits of all manual shade bands, and assure alignment in accordance with the above requirements.
10. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
11. WC shall train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.
  - a. Use operation and maintenance manual as a reference, supplemented with additional training materials as required.

#### **3.04 PROTECTION AND CLEANING**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.
  1. Clean soiled shades and exposed components as recommended by manufacturer.
  2. Replace shades that cannot be cleaned to "like new" condition.

**END OF SECTION**

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**SECTION 12 36 00  
COUNTERTOPS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Countertops for architectural cabinet work.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 41 00 - Architectural Wood Casework.

**1.03 REFERENCE STANDARDS**

- A. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications; 2022.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.
- C. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.
- D. ISFA 3-01 - Classification and Standards for Quartz Surfacing Material; 2013.
- E. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- F. NSI (DSDM) - Dimensional Stone Design Manual, Version VIII; 2016.
- G. PS 1 - Structural Plywood; 2009.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Specimen warranty.
- C. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.
- D. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.
- E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- F. Installation Instructions: Manufacturer's installation instructions and recommendations.
- G. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

**1.05 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Natural Stone Institute (NSI) Accredited Natural Stone Fabricator; [www.naturalstoneinstitute.org/#sle](http://www.naturalstoneinstitute.org/#sle).
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

## 1.07 FIELD 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.

## PART 2 PRODUCTS

### 2.01 COUNTERTOPS

- A. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
1. Laminate Sheet: NEMA LD 3, Grade HGS, 0.048 inch nominal thickness.
    - a. Manufacturers:
      - 1) Formica Corporation: [www.formica.com/#sle](http://www.formica.com/#sle).
      - 2) Lamin-Art, Inc: [www.laminart.com/#sle](http://www.laminart.com/#sle).
      - 3) Panolam Industries International, Inc; Nevamar Standard HPL: [www.panolam.com/#sle](http://www.panolam.com/#sle).
      - 4) Panolam Industries International, Inc; Pionite Standard HPL: [www.panolam.com/#sle](http://www.panolam.com/#sle).
      - 5) Wilsonart: [www.wilsonart.com/#sle](http://www.wilsonart.com/#sle).
      - 6) Substitutions: See Section 01 60 00 - Product Requirements.
    - b. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
    - c. Finish: Matte or suede, gloss rating of 5 to 20.
    - d. Surface Color and Pattern: As selected by Architect from the manufacturer's custom line.
  2. Back and End Splashes: Same material, same construction. 3 MM PVC Edgebanding.
  3. Edgeband: 3 MM PVC.
  4. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Custom Grade.
- B. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
1. Flat Sheet Thickness: 3/4 inch, minimum.
  2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
    - a. Manufacturers:
      - 1) Avonite Surfaces: [www.avonitesurfaces.com/#sle](http://www.avonitesurfaces.com/#sle).
      - 2) Dupont: [www.corian.com/#sle](http://www.corian.com/#sle).
      - 3) Formica Corporation: [www.formica.com/#sle](http://www.formica.com/#sle).
      - 4) LG Hausys America, Inc; HI-MACS 12mm: [www.lghausysusa.com/#sle](http://www.lghausysusa.com/#sle).
      - 5) Wilsonart: [www.wilsonart.com/#sle](http://www.wilsonart.com/#sle).
      - 6) Substitutions: See Section 01 60 00 - Product Requirements.
    - b. Finish on Exposed Surfaces: Polished, gloss rating of 55 to 80.
    - c. Color and Pattern: As selected by Architect from manufacturer's full line.
  3. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.
  4. Fabricate in accordance with manufacturer's standard requirements.
- C. Natural Quartz and Resin Composite Countertops: Sheet or slab of natural quartz and plastic resin over continuous substrate.

1. Flat Sheet Thickness: 3/4 inch, minimum.
2. Natural Quartz and Resin Composite Sheets, Slabs and Castings: Complying with ISFA 3-01 and NEMA LD 3; orthophthalic polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard stone fabrication tools; no surface coating; color and pattern consistent throughout thickness.
  - a. Manufacturers:
    - 1) Cambria Company LLC: [www.cambriausa.com/#sle](http://www.cambriausa.com/#sle).
    - 2) Dal-Tile Corporation: [www.daltile.com/#sle](http://www.daltile.com/#sle).
    - 3) LG Hausys America, Inc; Viatera 3cm: [www.lghausysusa.com/#sle](http://www.lghausysusa.com/#sle).
    - 4) Substitutions: See Section 01 60 00 - Product Requirements.
  - b. Factory fabricate components to the greatest extent practical in sizes and shapes indicated; comply with NSI (DSDM).
  - c. Finish on Exposed Surfaces: Polished.
  - d. Color and Pattern: As indicated on drawings.
3. Other Components Thickness: 3/4 inch, minimum.
4. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.

## 2.02 MATERIALS

- A. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.
- B. Medium Density Fiberboard for Supporting Substrate: ANSI A208.2.
- C. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- D. Joint Sealant: Mildew-resistant silicone sealant, white.

## 2.03 FABRICATION

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
  1. Join lengths of tops using best method recommended by manufacturer.
  2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
  3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
  1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
  2. Height: 4 inches, unless otherwise indicated.
- C. Solid Surfacing: Fabricate tops and wall panels up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### **3.03 INSTALLATION**

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
- B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.
- C. Seal joint between back/end splashes and vertical surfaces.

### **3.04 TOLERANCES**

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- C. Field Joints: 1/8 inch wide, maximum.

### **3.05 CLEANING**

- A. Clean countertops surfaces thoroughly.

### **3.06 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

**END OF SECTION**



**SECTION 22 01 00  
PLUMBING GENERAL REQUIREMENTS**

**PART 1 - GENERAL**

1.01 CONDITIONS OF THE CONTRACT

- A. The conditions of the Contract (General, Supplementary, and other Conditions) and the General Requirements are hereby made a part of this Section.
- B. This Section is a Division 22 Basic Materials and Methods Section and is a part of each Division 22 Section.
- C. The contractor shall be responsible for construction coordination of all work described in this section with the work specified in other sections of the specifications and shown on the Drawings. In advance of construction, coordinate and work out any minor problems with other trades to avoid conflicts therewith. However, if other minor problems are encountered, bring these problems to the attention of the Designer, who will make the final decisions as to correction.
- D. If substituted equipment is to be used, the Contractor shall revise the floor plans shown on the Drawings, indicating to scale, the equipment to be used. The purpose of these revised scale plans is to identify any problems with substituted equipment, and access and clearance requirements are maintained. These revised scale plans are to be submitted with the substituted equipment submittals.

1.02 WORK INCLUDED

- A. This Section consists of General Requirements and Standard Specifications covering certain parts of work under Division 22 and is supplemented by other Division 22 sections covering additional work, requirements, and materials specifically applicable to the work of each section.

1.03 CODE AND REGULATORY AGENCY COMPLIANCE

- A. Provide work and materials in full accordance with the latest rules and regulations of the following:
  - 1. Occupational Safety and Health Administration
  - 2. 2018 Arkansas Plumbing Code
  - 3. National Fire Protection Association, 101, Life Safety Code

1.04 QUALITY ASSURANCE

- A. Manufacturers: Only firms regularly engaged in manufacturing of the Plumbing services, equipment and specialties of types and sizes required, whose products have been in satisfactory use in similar service shall be used on this project.
- B. Installers Qualifications: Only firms with successful installation experience on projects with work similar to that required for this project shall perform work on this project.

1.05 SUBMITTALS

- A. Comply with Section 013000, Submittals.

1.06 SITE EXAMINATION

- A. Examine site, verify dimensions and locations against Drawings, and inform self of conditions under which work is to be done before submitting proposal. No allowance will be made for extra expense on account of error.
- B. Information shown relative to existing services is based upon available records and data but is approximate only. Make minor deviations found necessary to conform with actual locations and conditions without extra cost. Verify location and elevation of utilities prior to commencement of excavation for new piping or its installation.

1.07 PLACEMENT OF EQUIPMENT AND WORK

- A. The placement of substituted equipment and specified equipment in the locations shown on the drawings shall be the Contractors responsibility. The Contractor shall verify that all substituted and specified equipment will fit, operate and have clearances and accessibility for maintenance, inspections, and operation within the space shown on the Drawings and/or clearances and accessibility cannot be achieved, he shall bring these problems to the attention of the Designer who will make the final decision as to the method of correction. Corrections to work already completed and in-place shall not constitute an increase in the contract amount.
- B. Move equipment and/or work into spaces through openings provided or located in the spaces during construction, as required.
- C. Do disassembling and reassembling of equipment or other work necessary to accomplish this requirement without extra cost to the Owner. Do not disassemble or reassemble any equipment in order to locate it in the space.

1.08 MATERIAL LIST AND SUBSTITUTIONS

- A. Comply with Supplementary General Conditions.

1.09 MAINTENANCE AND OPERATING INSTRUCTIONS

- A. Incorporate complete operating instructions including starting, stopping, and description of emergency manual operation methods for the following:
  - 1. Plumbing Pumps
  - 2. Plumbing systems
  - 3. Water Heating Systems
  - 4. Provide charts and diagrams as required
  - 5. Provide operating manual for any equipment listed in individual sections of the specifications
- B. Provide maintenance instructions for each item of individual equipment covering pertinent maintenance data, such as lubricants to be used, frequency of lubrications, inspections required, adjustments, belt and pulley sizes, etc.
- C. Provide parts, bulletins containing manufacturer=s bulletins with parts numbers, instructions, etc., for each item of equipment. Strip bulletins so that useless bulk is avoided.
- D. Post service telephone numbers and/or addresses in an appropriate place as designated by the Designer.

**PART 2 - PRODUCTS**

2.01 MATERIALS AND EQUIPMENT

- A. Mention herein or on Drawings requires that this Contractor provide each item listed of quality noted. All material shall be new, full weight, standard in all respects, and in first-class condition. Provide materials of the same brand of manufacture as allowed in associated specification section throughout for each class of material or equipment where possible. Materials shall be tested within the Continental United States by independent, nationally recognized testing agency and shall be listed in accordance with testing agency requirements.
- B. The grade or quality of materials desired is indicated by the trade names or catalog numbers stated herein. The catalog numbers and specification are for bidding purposes

only. Actual equipment submitted and ordered shall be verified to be appropriate for indicated use.

- C. Dimension, sizes, and capacities shown are a minimum and shall not be changed without permissions of the Designer.

2.02 MATERIALS FURNISHED

- A. Identify all materials and equipment by manufacturer=s name and model number. Remove unidentified materials and equipment from site.
- B. Equipment specified by manufacturer=s number shall include all accessories, controls, etc., listed in catalog as standard with equipment. Furnish optional or additional accessories as specified.
- C. Equipment or material damaged during transportation, installation, or operation is considered as totally damaged. Replace with new equipment. Variance for this permitted only with written consent of the Designer.

**PART 3 - EXECUTION**

3.01 DRAWINGS AND COORDINATION

- A. General arrangement and location of piping, equipment, etc., are shown on Drawings or herein specified. Careful examine other work that may conflict with this work. Install this work in harmony with other crafts and at proper time to avoid delay of work.
- B. In advance of construction, work out minor changes and relocations to suit actual conditions and work of other trades to avoid conflict therewith. Any change in rerouting ductwork, piping and equipment shall not be cause for additional cost.
- C. The Sub-Contractor shall verify that the measurement of constructed rooms, spaces and areas are as shown on Drawings. Any measurement deviation and/or discrepancies shall be brought to the attention of the Designer who will make the final decision as to the method of correction. Corrections to work already completed and in place shall be done at the Contractor=s expense.
- D. In addition, obtain all necessary information from the other trades regarding centers of partitions, walls, location of plumbing mains, fire sprinkler mains, and electrical conduits, ducts, pipes, etc., in order that pipes equipment, and ductwork may be placed in their correct position.
- E. Execute any work or apparatus shown on the Drawings and not mentioned in the specifications, or vice versa, the same as if specifically mentioned by both Omission from Drawings or specifications of any minor details of construction, installation, materials or

essential specialties does not relieve this Contractor from furnishing same in place complete.

- F. Furnish and install any incidental work not shown or specified which can reasonably be inferred as part of the work and necessary to provide a complete and workable system.
- G. Furnish materials and work at proper time to avoid delay of the work.

3.02 CLOSING IN ON UNINSPECTED WORK

- A. Do not allow or cause work installed to be covered up or enclosed before it has been inspected and tested. Should work be enclosed or covered up before it has been inspected and tested, Contractor shall uncover work at own expense. After it has been inspected and tested, make repairs necessary to restore work of other Contractors to condition in which it was found at time of cutting.
- B. Two (2) sets of Drawings showing all revisions shall be immediately presented to Designer for his records. Maintain additional copies on the project as necessary to comply with @RECORD DRAWINGS@ requirement of the General Requirements.
- C. Incorporate all revisions into record Drawings. These drawings shall be up to date at the end of every week and shall be available to Designer at any time for inspection.

3.03 GUARANTEE

- A. Be responsible for work done and material installed under these plans and specifications. Repair or replace, as may be necessary, any defective work, material, or part which may show itself within one (1) year of filing of Notice of Completion and be responsible for damage to other materials, furnishing, equipment, or premises caused by such defects during this period, if in the opinion of the Designer said defect is due to imperfection of material or workmanship. Provide all such work and materials at no cost to Owner.
- B. Be responsible for damage to any part of premises during guarantee period caused by leaks or breaks in work furnished and/or installed under this Section.
- C. Replace refrigerant, lubricants, or gases lost as a result of defects, breaks, or leaks in work.

3.04 RECORD DRAWINGS

- A. In addition, furnish one (1) tracing showing all outside utility connections, piping, etc., installed under this contract. Locate and dimension all work with reference to permanent landmarks.

- B. Match all symbols and designations used in contract Drawings when preparing Record Drawings.
- C. Indicate clearly and correctly all work installed differently from that shown, and maintain records up to date as work progresses. Include invert elevations of pipes below grade of floor, the floor lines, plugged wyes, tees, caps, exact locations and sizing or piping, location of valves, and the like. Dimension locations from structural points.
- D. Properly identify all stubs for future connections as to locations and use by setting of concrete marker at finished grade in manner suitable to Designer.

3.05 MAINTENANCE DATA

- A. Submit maintenance data and parts lists for all plumbing systems materials and products. Include product data, shop drawings, and Record Drawings in the maintenance manual all in allowance with the requirements of Division 1.

3.06 CLEANING UP

- A. Comply with Supplementary General Conditions.

**END OF SECTION 22 01 00 Plumbing General Requirements**

**SECTION 22 02 00**

**PLUMBING PIPING**

**PART 1 -GENERAL**

1.01 SECTION INCLUDES:

- A. Pipe and pipe fittings.
- B. Valves.
- C. Sanitary sewer piping system.
- D. Domestic water piping system.

1.02 RELATED SECTIONS:

- A. Section 22 05 29 - Supports and Anchors.
- B. Section 22 05 53 - Mechanical Identification.
- C. Section 22 07 00 - Piping Insulation.

1.03 REFERENCES:

- A. ANSI B31.1 -Power Piping.
- B. ASME B16.18 -Cast Bronze Solder-Joint Pressure Fittings.
- C. ASME B16.22 -Wrought Copper and Bronze Solder-Joint Pressure Fittings.
- D. ASTM A53 -Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
- E. ASTM A74 -Cast Iron Soil Pipe and Fittings.
- F. ASTM A120 -Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized), Welded and Seamless, for Ordinary Uses.
- G. ASTM A234 -Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.
- H. ASTM B42 -Seamless Copper Pipe.

- I. ASTM B75 -Seamless Copper Tube.
- J. ASTM B88 -Seamless Copper Water Tube.
- K. ASTM C564 -Rubber Gaskets for Cast Iron Soil Pipe.
- L. AWWA C110 -Ductile-Iron and Gray-Iron Fittings 3 in. Through 48 in., for Water and Other Liquids.
- M. AWWA C111 -Rubber-Gasket Joints for Ductile Iron and Gray-Iron Pressure Pipe and Fittings.
- N. AWWA C651 -Disinfecting Water Mains.
- O. CISPI 310 -Joints for Hubless Cast Iron Sanitary Systems.

1.04 QUALITY ASSURANCE:

- A. Valves: Manufacturer's name and pressure rating marked on valve body.
- B. Welding Materials and Procedures: Conform to ASME Code.
- C. Welders Certification: In accordance with ASME Section VIII.

1.05 REGULATORY REQUIREMENTS:

- A. Perform Work in accordance with applicable plumbing code.
- B. Conform to applicable code for installation of backflow prevention devices.
- C. Provide certificate of compliance from authority having jurisdiction.

1.06 DELIVERY, STORAGE AND HANDLING:

- A. Deliver, store, protect and handle products to site under provisions of Section 22 01 00.
- B. Accept valves on site in shipping containers with labeling in place.
- C. Provide temporary protective coating on cast iron and steel valves.
- D. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.



- E. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.07 ENVIRONMENTAL REQUIREMENTS:

- A. Do not install underground piping when bedding is wet or frozen.

1.08 EXTRA MATERIALS:

- A. Furnish under provisions of Section 23 02 00.
- B. Provide two re packing kits for each size valve.

**PART 2 -PRODUCTS**

2.01 SANITARY SEWER PIPING, BURIED BEYOND 5 FEET OF BUILDING:

Not Used

2.02 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING:

- A. Cast Iron Pipe: ASTM A74 service weight.
  - 1. Fittings: Cast Iron.
  - 2. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or no-hub.
- B. Schedule 40, PVC Pipe. ASTM D2665.
  - 1. Fittings: PVC.
  - 2. Joints: D2855, solvent weld with ASTM D2564 solvent cement.

2.03 SANITARY SEWER PIPING ROOF DRAINAGE, ABOVE GROUND:

Not Used

2.04 WATER PIPING, ABOVE GROUND:

- A. Copper Tubing: ASTM B88, Type L, hard drawn.
  - 1. Fittings: ASME B16.18, cast bronze, or ASME B16.22, wrought copper and bronze.
  - 2. Joints: ASTM B32, solder, Grade 96TA.

2.06 FLANGES, UNIONS, AND COUPLINGS:

- A. Pipe Size 2 inches and Under:
  - 1. Ferrous Pipe: 150 psig malleable iron threaded unions.
  - 2. Copper Tube and Pipe: 150 psig bronze unions with soldered joints.
  
- B. Pipe Size over 2 inches:
  - 1. Ferrous Pipe: 150 psig forged steel slip-on flanges; 1/16 inch thick preformed neoprene gaskets.
  - 2. Copper Tube and Pipe: 150 psig slip-on bronze flanges; 1/16 inch thick preformed neoprene gaskets.
  
- C. Grooved and Shouldered Pipe End Couplings:
  - 1. Housing: Malleable iron clamps to engage and lock, designed to permit some angular deflection, contraction, and expansion; steel bolts, nuts, and washers; galvanized for galvanized pipe.
  - 2. Sealing Gasket: "C" shape composition sealing gasket.
  
- D. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.10 GATE VALVES:

- A. Manufacturers:
  - i) Milwaukee Valve Company
  - ii) Hammond Valve Corporation
  - iii) NIBCO Inc.
  
- B. Up to and including 2 inches: Bronze body, bronze trim, non-rising stem, handwheel, inside screw, single wedge or disc, threaded ends.
  
- C. Over 2 inches: Iron body, bronze trim, rising stem, handwheel, OS&Y, single wedge, flanged ends.

2.11 BALL VALVES:

A. Manufacturers:

- i) Milwaukee Valve Company
- ii) Hammond Valve Corporation
- iii) NIBCO Inc.

- B. Up to and including 2 inches: Bronze two piece body, stainless steel ball, Teflon seats and stuffing box ring, lever handle, threaded ends with union.

**PART 3 EXECUTION**

3.01 EXAMINATION:

- A. Verify that excavations are to required grade, dry, and not over-excavated.

3.02 PREPARATION:

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on the inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.03 INSTALLATION:

- A. Install in accordance with manufacturers' instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Route piping in orderly manner and maintain gradient.
- D. Install piping to conserve building space and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- G. Provide clearance for installation of insulation and access to valves and fittings.

- H. Provide access where valves and fittings are not exposed.
- I. Establish elevations of buried piping outside the building to ensure not less than three feet of cover.
- J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- K. Provide support for utility meters in accordance with the requirements of utility companies.
- L. Prepare support for fittings, supports and accessories not prefinished, ready for finish painting.
- M. Install bell and spigot pipe with bell end upstream.
- N. Install valves with stem upright or horizontal, not inverted.
- O. Slope piping and arrange to drain at low points. Use eccentric reducers to maintain top of pipe level.

#### 3.04 APPLICATION:

- A. Use grooved mechanical couplings and fasteners only in accessible locations.
- B. Install unions downstream of valves and at equipment or apparatus connections.
- C. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.
- D. Install gate valve for shut-off and to isolate equipment, part of system, or vertical risers.

#### 3.05 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM:

- A. Prior to starting work, verify system is complete, flushed and clean.
- B. Ensure PH of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
- C. Inject disinfectant, free chlorine in liquid, powder, tablet, or gas form, throughout system to obtain 50 to 80 mg/L residual.

- D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum of 15 percent of outlets.
- E. Maintain disinfectant in system for 24 hours.
- F. If final disinfectant residual test less than 25 mg/L, repeat treatment.
- G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
- H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

**END OF SECTION 22 02 00**

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**SECTION 22 05 29  
HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT**

**PART 1 - GENERAL**

1.01 SECTION INCLUDES:

- A. Pipe and equipment hangers and supports.
- B. Equipment bases and supports.
- C. Sleeves and seals.
- D. Flashing and sealing equipment and pipe stacks.

1.02 RELATED SECTIONS:

Not used.

1.03 REFERENCES:

- A. ASME B31.1 - Power Piping.
- B. ASME B31.9 - Building Services Piping.
- C. ASTM F708 - Design and Installation of Rigid Pipe Hangers.
- D. MSS SP58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
- E. MSS SP69 - Pipe Hangers and Supports - Selection and Application.
- F. MSS SP89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

**PART 2 - PRODUCTS**

2.01 PIPE HANGERS AND SUPPORTS:

- A. Manufacturers:
  - 1. Grinnell
  - 2. B-Line
  - 3. Unistrut
- B. Plumbing Piping - DWV
  - 1. Conform to ASME B31.9.

2. Hangers for Pipe Sizes 2 to 1-1/2 inch: Carbon steel, adjustable swivel, split ring.
3. Hangers for Pipe Sizes 2 inches and over: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
5. Wall Support for Pipe Sizes to 3 inches: Cast iron hook.
6. Wall Support for Pipe Sizes to 4 inches and Over: Welded steel bracket and wrought steel clamp.
7. Vertical Support: Steel riser clamp.
8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
9. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

C. Plumbing Piping - Water

1. Conform to ASME B31.9.
2. Hangers for Pipe Sizes 2 to 1-1/2 inch: Carbon steel, adjustable swivel, split ring.
3. Hangers for Cold Pipe Sizes 2 inches and over: Carbon steel, adjustable, clevis.
4. Hangers for Hot Pipe Sizes 2 to 4 inches: Carbon steel, adjustable, clevis.
5. Hangers for Hot Pipe Sizes 6 inches and Over: Adjustable steel yoke, cast iron roll, double hanger.
6. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
7. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 inches and Over: Steel channels with welded spacers and hanger rods, cast iron roll.
8. Wall Support for Pipe Sizes to 3 inches: Cast iron hook.
9. Wall Support for Pipe Sizes 4 inches and Over: Welded steel bracket and wrought steel clamp.
10. Wall Support for Hot Pipe Sizes 6 inches and Over: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron roll.
11. Vertical Support: Steel riser clamp.
12. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
13. Floor Support for Hot Pipe Sizes to 4 inches: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
14. Floor Support for Hot Pipe Sizes 6 inches and Over: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.
15. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
16. Roof Support: Polycarbonate pipe stand, Micro Industries Model 24R or Equal.

2.02 ACCESSORIES:

- A. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

2.03 INSERTS:

- A. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.04 FLASHING:



- A. Metal Flashing: 26 gage galvanized steel.
- B. Metal Counter flashing: 22 gage galvanized steel.
- C. Lead Flashing:
  - 1. Waterproofing: 5 lb/ft<sup>2</sup> sheet lead.
  - 2. Soundproofing: 1 lb/ft<sup>2</sup> sheet lead.
- D. Flexible Flashing: 47 mil thick sheet butyl; compatible with roofing.
- E. Caps: Steel, 22 gage minimum; 16 gage at fire resistant elements.

#### 2.05 EQUIPMENT CURBS:

- A. Fabrication: Welded 18 gage galvanized steel shell and base, mitered 3 inch cant, pitched to match roof slope, 1-1/2 inch thick insulation, factory installed wood nailer.

#### 2.06 SLEEVES:

- A. Sleeves for Pipes Through Non-fire Rated Floors: 18 gage galvanized steel.
- B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe of 18 gage galvanized steel.
- C. Sleeves for Pipes Through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL listed.
- D. Sleeves for Round Duct work: Galvanized steel.
- E. Sleeves for Rectangular Duct work: Galvanized steel.
- F. Fire stopping Insulation: Glass fiber type, non-combustible.
- G. Sealant: Acrylic.

### **PART 3 EXECUTION**

#### 3.01 INSTALLATION:

- A. Install in accordance with manufacturer=s instructions.

#### 3.02 INSERTS:

- A. Provide inserts for placement in concrete form work.

- B. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
- D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
- E. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

### 3.03 PIPE HANGERS AND SUPPORTS:

- A. Support horizontal piping as scheduled.
- B. Install hangers to provide minimum 2 inch space between finished covering and adjacent work.
- C. Place hangers within 12 inches of each horizontal elbow.
- D. Use hangers within 1-1/2 inch minimum vertical adjustment.
- E. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.
- F. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.
- G. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- H. Support riser piping independently of connected horizontal piping.
- I. Design hangers for pipe movement without disengagement of supported pipe.
- J. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

### 3.04 EQUIPMENT BASES AND SUPPORTS

- A. Provide housekeeping pads of concrete, minimum 4 inches thick and extended 6 inches beyond supported equipment.
- B. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.
- C. Construct supports of steel members. Brace and fasten with flanges bolted to structure.
- D. Provide rigid anchors for pipes after vibration isolation components are installed.

### 3.05 FLASHING:

- A. Provide flexible flashing and metal Counter flashing where piping and duct work penetrate weather or waterproofed walls, floors, and roofs.
- B. Flash vent and soil pipes projecting 3 inches minimum above finished roof surface with lead worked one inch minimum into hub, 8 inches minimum clear on both sides with 24 x 24 inches sheet size. For pipes through outside walls, turn flanges back into wall and caulk, metal counter flash, and seal.
- C. Seal drains watertight to adjacent materials.
- D. Provide curbs for mechanical roof installations 14 inches minimum height above roofing surface. Flash and counter flash with sheet metal; seal weather tight. Attach Counter flashing mechanical equipment and lap base flashing on roof curbs. Flatten and solder joints.
- E. Adjust storm collars tight to pipe with bolts; caulk around top edge. Use storm collars above roof jacks. Screw vertical flange section to face of curb.

### 3.06 SLEEVES:

- A. Set sleeves in position in form work. Provide reinforcing around sleeves.
- B. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- C. Extend sleeves through floors one inch above finished floor level. Caulk sleeves.
- D. Where piping or ductwork penetrates floor, ceiling, or wall, close off space between pipe or duct and adjacent work with fire stopping insulation and caulk. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
- E. Install chrome plated steel escutcheons at finished surfaces.

3.07 SCHEDULES:

HANGER ROD (inches)	PIPE SIZE (inches)	HANGER SPACING (feet)
3/8	2 to 1-1/4	6.5
3/8	1-1/2 to 2	10
1/2	2-1/2 to 3	10
5/8	4 to 6	10
7/8	8 to 12	14
5/8	PVC (all sizes)	6
1/2	C.I. Bell and Spigot (or No-Hub) and at Joints	5

**END OF SECTION 22 05 29 Hangers and Supports for Plumbing Piping and Equipment**

**SECTION 22 05 53**  
**IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT**

**PART 1 - GENERAL**

1.01 SECTION INCLUDES:

- A. Nameplates.
- B. Tags.
- C. Pipe Markers.

1.02 REFERENCES:

- A. ASME A13.1 - Scheme for the Identification of Piping Systems.

**PART 2 - PRODUCTS**

2.01 NAMEPLATES:

- A. Manufacturers:
  - 1. Brady
  - 2. Seton
  - 3. Carlton.
- B. Description: Laminated three-layer plastic with engraved black letters on light contrasting background color.

2.02 TAGS:

- A. Manufacturers:
  - 1. Brady
  - 2. Seton
  - 3. Carlton.
- B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.
- C. Chart: Typewritten letter size list in anodized aluminum frame.

2.03 STENCILS:

Not used.

2.04 PIPE MARKERS:

A. Manufacturers:

1. Brady
2. Seton
3. Carlton.

B. Color: Conform to ASME A13.1.

D. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

E. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

F. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.

2.05 CEILING TACKS:

A. Manufacturers:

1. Brady
2. Seton
3. Carlton.

B. Description: Steel with 3/4 inch diameter color coded head.

C. Color code as follows:

1. Green - Plumbing valves.

2.06 PAINTING:

A. Manufacturers: Products recognized for pipe application. Paint applied directly to elastomeric insulation shall be made specifically for that purpose.

B. Description: Paint all exposed gas piping. Employ qualified craftsman with a minimum of three years experience in pipe painting.

**PART 3 EXECUTION**

3.01 PREPARATION:

A. Degrease and clean surfaces to receive adhesive for identification materials.

B. Prepare surfaces for painting.

3.02 INSTALLATION:

- A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Install plastic pipe markers in accordance with manufacturer=s instructions.
- D. Install plastic pipe marker complete around pipe in accordance with manufacturer=s instructions.
- E. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.
- F. Identify air handling units with tags.
- G. Identify valves in main and branch piping with tags.
- H. Identify piping, concealed or exposed, with plastic pipe markers. Use tags on piping 3/4 inch diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.
- I. Provide ceiling tacks to locate valves or dampers above T-bar type panel ceilings. Locate in corner of panel closet to equipment.

**END OF SECTION 22 05 53 Identification for Plumbing and Equipment**

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**SECTION 22 07 00  
PLUMBING INSULATION**

**PART 1 - GENERAL**

1.01 SECTION INCLUDES:

- A. Piping insulation.
- B. Jackets and accessories.

1.02 RELATED SECTIONS:

Not used.

1.03 REFERENCES:

- A. ASTM C195 - Mineral Fiber Thermal Insulation Cement
- B. ASTM C335 - Steady-State Heat Transfer Properties of Horizontal Pipe Insulation
- C. ASTM C449 - Mineral Fiber and Hydraulic-setting Thermal Insulating and Finishing Cement.
- D. ASTM 534 - Performed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
- E. ASTM C547 - Mineral Fiber and Performed Pipe Insulation.

1.04 QUALITY ASSURANCE:

- A. Materials: Flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84 suitable for return air plenums.

1.05 QUALIFICATIONS:

- A. Applicator: Company specializing in performing the work of this section with a minimum of three years experience.

1.06 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver, store protect and handle products to site under provisions of Section 22 02 00.
- B. Deliver materials to site in original factory packaging, labeled with manufacture's identification, including product density and thickness
- C. Store insulation in original wrapping and protect form weather and construction traffic.
- D. Protect insulation against dirt, water, chemical, and mechanical damage.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Maintain ambient temperatures and conditions required by manufactures of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum of 24 hours.

## **PART 2 - PRODUCTS**

### 2.01 GLASS FIBER:

#### A. Manufacturers:

- 1. Owen's-Corning,
- 2. Manville
- 3. Knauf Corporation

#### B. Installation: ASTM C547; rigid molded, noncombustible.

- 1. 'K' ('ksi') value: ASTM C335, 0.24 at 75 degrees F.
- 2. Minimum Service Temperature: -20 degrees F.
- 3. Maximum Service Temperature: 300 degrees F.
- 4. Maximum moisture absorption: 0.2 percent by volume.

#### C. Vapor Barrier Jacket

- 1. ASTM C921, White kraft paper reinforced with glass fiber yarn and bonded to aluminized film.
- 2. Moisture Vapor Transmission: ASTM E96; 0.02 perm inches.
- 3. Secure with self sealing longitudinal laps and butt strips.
- 4. Secure outward with outward clinch expanding staples and vapor barrier mastic.

#### D. Tie Wire: 18 gage stainless steel with twisted ends on maximum 12 inch centers.

#### E. Vapor Barrier Lap Adhesive

- 1. Compatible with insulation.

#### F. Insulating Cement/Mastic

- 1. ASTM C185; hydraulic setting on mineral wool.

## **PART 3 EXECUTION**

### 3.01 Examination:

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

### 3.02 INSTALLATION:

- A. Install materials in accordance with manufacturer's instructions.
- B. On exposed piping, locate insulation and cover seams in least visible locations.
- C. Insulated cold pipes conveying fluids below ambient temperature:
  - 1. Provide vapor barrier jackets, factory applied or field applied.
  - 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness of adjacent pipe.
  - 3. Finish with glass cloth and vapor barrier adhesive.
  - 4. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations.
  - 5. Insulate entire system including fittings, valves, unions, flanges, strainer, flexible connections, and expansion joints.
- D. For insulated pipes covering fluids above ambient temperature:
  - 1. Provide standard jackets, with vapor barrier, factory applied or field applied.
  - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe.
  - 3. Finish with glass cloth and adhesive.
  - 4. Not used
  - 5. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but level and seal ends of insulation.
  - 6. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
- E. Inserts and Shields
  - 1. Application: Piping 1-1/2 inches diameter or larger.
  - 2. Shields galvanized steel between pipe hangers or pip hanger rolls and inserts.
  - 3. Insert location: Between support shields and piping under the finish jacket.
  - 4. Insert Configuration: Minimum of 6 inches long, of same thickness and contour as adjoining insulation; maybe factory fabricated.
  - 5. Insert Materials: Hydrous calcium silicate insulation
- F. Finish insulation at supports, protrusions, and interruptions.

3.03 GLASS FIBER INSULATION SCHEDULE:

PIPING	PIPE	THICKNESS
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SYSTEMS	SIZE	(Inch)
Domestic Hot Water & Recirc	up to 1 1/2"	1"
	2" and larger	2"
Domestic Cold Water	All	1/2"

**END OF SECTION 22 07 00 - Plumbing Insulation**

**SECTION 23 01 00  
HVAC GENERAL REQUIREMENTS**

**PART 1 - GENERAL**

1.01 CONDITIONS OF THE CONTRACT

- A. The conditions of the Contract (General, Supplementary, and other Conditions) and the General Requirements are hereby made a part of this Section.
- B. This Section is a Division 23 Basic Materials and Methods Section and is a part of each Division 23 Section.
- C. The contractor shall be responsible for construction coordination of all work described in this section with the work specified in other sections of the specifications and shown on the Drawings. In advance of construction, coordinate and work out any minor problems with other trades to avoid conflicts therewith. However, if other minor problems are encountered, bring these problems to the attention of the Designer, who will make the final decisions as to correction.
- D. If substituted equipment is to be used, the Contractor shall revise the floor plans shown on the Drawings, indicating to scale, the equipment to be used. The purpose of these revised scale plans is to identify any problems with substituted equipment, and access and clearance requirements are maintained. These revised scale plans are to be submitted with the substituted equipment submittals.

1.02 WORK INCLUDED

- A. This Section consists of General Requirements and Standard Specifications covering certain parts of work under Division 23 and is supplemented by other Division 23 sections covering additional work, requirements, and materials specifically applicable to the work of each section.

1.03 CODE AND REGULATORY AGENCY COMPLIANCE

- A. Provide work and materials in full accordance with the latest rules and regulations of the following:
  - 1. Occupational Safety and Health Administration
  - 2. 2021 International Mechanical Code
  - 3. National Fire Protection Association, 101, Life Safety Code

1.04 QUALITY ASSURANCE

- A. Manufacturers: Only firms regularly engaged in manufacturing of the HVAC services, equipment and specialties of types and sizes required, whose products have been in satisfactory use in similar service shall be used on this project.
- B. Installers Qualifications: Only firms with successful installation experience on projects with work similar to that required for this project shall perform work on this project.

1.05 SUBMITTALS

- A. Comply with Section 01300, Submittals.

1.06 SITE EXAMINATION

- A. Examine site, verify dimensions and locations against Drawings, and inform self of conditions under which work is to be done before submitting proposal. No allowance will be made for extra expense on account of error.
- B. Information shown relative to existing services is based upon available records and data but is approximate only. Make minor deviations found necessary to conform with actual locations and conditions without extra cost. Verify location and elevation of utilities prior to commencement of excavation for new piping or its installation.

1.07 PLACEMENT OF EQUIPMENT AND WORK

- A. The placement of substituted (approved equal) equipment and specified equipment in the locations shown on the drawings shall be the Contractors responsibility. The Contractor shall verify that all substituted and specified equipment will fit, operate and have clearances and accessibility for maintenance, inspections, and operation within the space shown on the Drawings and/or clearances and accessibility cannot be achieved, he shall bring these problems to the attention of the Designer who will make the final decision as to the method of correction. Corrections to work already completed and in-place shall not constitute an increase in the contract amount.
- B. Move equipment and/or work into spaces through openings provided or located in the spaces during construction, as required.
- C. Do disassembling and reassembling of equipment or other work necessary to accomplish this requirement without extra cost to the Owner. Do not disassemble or reassemble any equipment in order to locate it in the space.

1.08 MATERIAL LIST AND SUBSTITUTIONS

- A. Comply with Supplementary General Conditions.

1.09 MAINTENANCE AND OPERATING INSTRUCTIONS

- A. Incorporate complete operating instructions including starting, stopping, and description of emergency manual operation methods for the systems provided.
- B. Provide maintenance instructions for each item of individual equipment covering pertinent maintenance data, such as lubricants to be used, frequency of lubrications, inspections required, adjustments, belt and pulley sizes, etc.
- C. Provide parts, bulletins containing manufacturer=s bulletins with parts numbers, instructions, etc., for each item of equipment. Strip bulletins so that useless bulk is avoided.
- D. Post service telephone numbers and/or addresses in an appropriate place as designated by the Designer.

**PART 2 - PRODUCTS**

2.01 MATERIALS AND EQUIPMENT

- A. Mention herein or on Drawings requires that this Contractor provide each item listed of quality. All material shall be new, full weight, standard in all respects, and in first-class condition. Provide materials of the same brand of manufacture throughout for each class of material or equipment where possible. Materials shall be tested within the Continental United States by independent, nationally recognized testing agency and shall be listed in accordance with testing agency requirements.
- B. The grade or quality of materials desired is indicated by the trade names or catalog numbers stated herein. The catalog numbers and specification are for bidding purposes only. Actual equipment submitted and ordered shall be verified to be appropriate for indicated use.
- C. Dimension, sizes, and capacities shown are a minimum and shall not be changed without permissions of the Designer.

2.02 MATERIALS FURNISHED

- A. Identify all materials and equipment by manufacturer=s name and model number. Remove unidentified materials and equipment from site.

- B. Equipment specified by manufacturer=s number shall include all accessories, controls, etc., listed in catalog as standard with equipment. Furnish optional or additional accessories as specified.
- C. Equipment or material damaged during transportation, installation, or operation is considered as totally damaged. Replace with new equipment. Variance for this permitted only with written consent.

### **PART 3 - EXECUTION**

#### **3.01 DRAWINGS AND COORDINATION**

- A. General arrangement and location of piping, ductwork, equipment, etc., are shown on Drawings or herein specified. Careful examine other work that may conflict with this work. Install this work in harmony with other crafts and at proper time to avoid delay of work.
- B. In advance of construction, work out minor changes and relocations to suit actual conditions and work of other trades to avoid conflict therewith. Any change in rerouting ductwork, piping and equipment shall not be cause for additional cost.
- C. The Sub-Contractor shall verify that the measurement of constructed rooms, spaces and areas are as shown on Drawings. Any measurement deviation and/or discrepancies shall be brought to the attention of the Designer who will make the final decision as to the method of correction. Corrections to work already completed and in place shall be done at the Contractor=s expense.
- D. In addition, obtain all necessary information from the other trades regarding centers of partitions, walls, location of plumbing mains, fire sprinkler mains, and electrical conduits, ducts, pipes, etc., in order that pipes equipment, and ductwork may be placed in their correct position.
- E. Execute any work or apparatus shown on the Drawings and not mentioned in the specifications, or vice versa, the same as if specifically mentioned by both Omission from Drawings or specifications of any minor details of construction, installation, materials or essential specialties does not relieve this Contractor from furnishing same in place complete.
- F. Furnish and install any incidental work not shown or specified which can reasonably be inferred as part of the work and necessary to provide a complete and workable system.
- G. Furnish materials and work at proper time to avoid delay of the work.

#### **3.02 CLOSING IN ON UNINSPECTED WORK**



- A. Do not allow or cause work installed to be covered up or enclosed before it has been inspected and tested. Should work be enclosed or covered up before it has been inspected and tested, Contractor shall uncover work at own expense. After it has been inspected and tested, make repairs necessary to restore work of other Contractors to condition in which it was found at time of cutting.
- B. Two (2) sets of Drawings showing all revisions shall be immediately presented to Designer for his records. Maintain additional copies on the project as necessary to comply with @RECORD DRAWINGS@ requirement of the General Requirements.
- C. Incorporate all revisions into record Drawings. These drawings shall be up to date at the end of every week and shall be available to Designer at any time for inspection.

### 3.03 GUARANTEE

- A. Be responsible for work done and material installed under these plans and specifications. Repair or replace, as may be necessary, any defective work, material, or part which may show itself within one (1) year of filing of Notice of Completion and be responsible for damage to other materials, furnishing, equipment, or premises caused by such defects during this period, if in the opinion of the Designer said defect is due to imperfection of material or workmanship. Provide all such work and materials at no cost to Owner.
- B. Be responsible for damage to any part of premises during guarantee period caused by leaks or breaks in work furnished and/or installed under this Section.
- C. Replace refrigerant, lubricants, or gases lost as a result of defects, breaks, or leaks in work.

### 3.04 RECORD DRAWINGS

- A. In addition, furnish one (1) tracing showing all outside utility connections, piping, etc., installed under this contract. Locate and dimension all work with reference to permanent landmarks.
- B. Match all symbols and designations used in contract Drawings when preparing ARecord@ Drawings.
- C. Indicate clearly and correctly all work installed differently from that shown, and maintain records up to date as work progresses. Include invert elevations of pipes below grade of floor, the floor lines, plugged wyes, tees, caps, exact locations and sizing or piping, location of valves, and the like. Dimension locations from structural points.
- D. Properly identify all stubs for future connections as to locations and use by setting of concrete marker at finished grade in manner suitable to Designer.

3.05 MAINTENANCE DATA

A. Submit maintenance data and parts lists for all HVAC systems materials and products. Include product data, shop drawings, and Record Drawings in the maintenance manual all in allowance with the requirements of Division 1.

3.06 CLEANING UP

A. Comply with Supplementary General Conditions.

**END OF SECTION 23 01 00 - HVAC General Requirements**

**SECTION 23 05 29  
HVAC SUPPORTS AND ANCHORS**

**PART 1 - GENERAL**

1.01 SECTION INCLUDES:

- A. Pipe and equipment hangers and supports.
- B. Equipment bases and supports.
- C. Sleeves and seals.
- D. Flashing and sealing equipment and pipe stacks.

1.02 RELATED SECTIONS:

- A. Section 22 07 00 - Piping Insulation.
- B. Section 22 01 00 - Plumbing Piping.

1.03 REFERENCES:

- A. ASME B31.1 - Power Piping.
- B. ASME B31.2 - Fuel Gas Piping.
- C. ASME B31.5 - Refrigeration Piping.
- D. ASME B31.9 - Building Services Piping.
- E. ASTM F708 - Design and Installation of Rigid Pipe Hangers.
- F. MSS SP58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
- G. MSS SP69 - Pipe Hangers and Supports - Selection and Application.
- H. MSS SP89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

**PART 2 - PRODUCTS**

2.01 PIPE HANGERS AND SUPPORTS:

- A. Manufacturers:
  - 1. Grinnel Mechanical Products

2. Cooper B-Line Inc,
3. National Pipe Hanger Corporation

B. Plumbing Piping - DWV, roof drainage:

1. Conform to ASME B31.9.
2. Hangers for Pipe Sizes 2 to 1-1/2 inch: Carbon steel, adjustable swivel, split ring.
3. Hangers for Pipe Sizes 2 inches and over: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
5. Wall Support for Pipe Sizes to 3 inches: Cast iron hook.
6. Wall Support for Pipe Sizes to 4 inches and Over: Welded steel bracket and wrought steel clamp.
7. Vertical Support: Steel riser clamp.
8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
9. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

C. Plumbing Piping - Water, Gas

1. Conform to ASME B31.9.
2. Hangers for Pipe Sizes 2 to 1-1/2 inch: Carbon steel, adjustable swivel, split ring.
3. Hangers for Cold Pipe Sizes 2 inches and over: Carbon steel, adjustable, clevis.
4. Hangers for Hot Pipe Sizes 2 to 4 inches: Carbon steel, adjustable, clevis.
5. Hangers for Hot Pipe Sizes 6 inches and Over: Adjustable steel yoke, cast iron roll, double hanger.
6. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
7. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 inches and Over: Steel channels with welded spacers and hanger rods, cast iron roll.
8. Wall Support for Pipe Sizes to 3 inches: Cast iron hook.
9. Wall Support for Pipe Sizes 4 inches and Over: Welded steel bracket and wrought steel clamp.
10. Wall Support for Hot Pipe Sizes 6 inches and Over: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron roll.
11. Vertical Support: Steel riser clamp.
12. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
13. Floor Support for Hot Pipe Sizes to 4 inches: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
14. Floor Support for Hot Pipe Sizes 6 inches and Over: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.
15. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
16. Roof Support: Polycarbonate pipe stand.

2.02 ACCESSORIES:

- A. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

2.03 INSERTS:

- A. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.04 FLASHING:

- A. Metal Flashing: 26 gage galvanized steel.
- B. Metal Counter flashing: 22 gage galvanized steel.
- C. Lead Flashing:
  - 1. Waterproofing: 5 lb/ft<sup>2</sup> sheet lead.
  - 2. Soundproofing: 1 lb/ft<sup>2</sup> sheet lead.
- D. Flexible Flashing: 47 mil thick sheet butyl; compatible with roofing.
- E. Caps: Steel, 22 gage minimum; 16 gage at fire resistant elements.

2.05 EQUIPMENT CURBS:

- A. Fabrication: Welded 18 gage galvanized steel shell and base, mitered 3 inch cant, pitched to match roof slope, 1-1/2 inch thick insulation, factory installed wood nailer.

2.06 SLEEVES:

- A. Sleeves for Pipes Through Non-fire Rated Floors: 18 gage galvanized steel.
- B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe of 18 gage galvanized steel.
- C. Sleeves for Pipes Through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL listed.
- D. Sleeves for Round Duct work: Galvanized steel.
- E. Sleeves for Rectangular Duct work: Galvanized steel.
- F. Fire stopping Insulation: Glass fiber type, non-combustible.
- G. Sealant: Acrylic.

**PART 3 EXECUTION**

3.01 INSTALLATION:

A. Install in accordance with manufacturer=s instructions.

### 3.02 INSERTS:

- A. Provide inserts for placement in concrete form work.
- B. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
- D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
- E. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

### 3.03 PIPE HANGERS AND SUPPORTS:

- A. Support horizontal piping as scheduled.
- B. Install hangers to provide minimum 2 inch space between finished covering and adjacent work.
- C. Place hangers within 12 inches of each horizontal elbow.
- D. Use hangers within 1-1/2 inch minimum vertical adjustment.
- E. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.
- F. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.
- G. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- H. Support riser piping independently of connected horizontal piping.
- I. Design hangers for pipe movement without disengagement of supported pipe.
- J. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- K. All duct work and piping shall be provided with seismic restraints in accordance with The Seismic Restraint Manual: Guidelines for Mechanical Systems dated 1991, as published by SMACNA and in accordance with local codes.

### 3.04 EQUIPMENT BASES AND SUPPORTS

- A. Provide housekeeping pads of concrete, minimum 4 inches thick and extended 6 inches beyond supported equipment.
- B. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.
- C. Construct supports of steel members. Brace and fasten with flanges bolted to structure.
- D. Provide rigid anchors for pipes after vibration isolation components are installed.

#### 3.05 FLASHING:

- A. Provide flexible flashing and metal Counter flashing where piping and duct work penetrate weather or waterproofed walls, floors, and roofs.
- B. Flash vent and soil pipes projecting 3 inches minimum above finished roof surface with lead worked one inch minimum into hub, 8 inches minimum clear on both sides with 24 x 24 inches sheet size. For pipes through outside walls, turn flanges back into wall and caulk, metal counter flash, and seal.
- C. Seal drains watertight to adjacent materials.
- D. Provide curbs for mechanical roof installations 14 inches minimum height above roofing surface. Flash and counter flash with sheet metal; seal weather tight. Attach Counter flashing mechanical equipment and lap base flashing on roof curbs. Flatten and solder joints.
- E. Adjust storm collars tight to pipe with bolts; caulk around top edge. Use storm collars above roof jacks. Screw vertical flange section to face of curb.

#### 3.06 SLEEVES:

- A. Set sleeves in position in form work. Provide reinforcing around sleeves.

- B. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- C. Extend sleeves through floors one inch above finished floor level. Caulk sleeves.
- D. Where piping or ductwork penetrates floor, ceiling, or wall, close off space between pipe or duct and adjacent work with fire stopping insulation and caulk. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
- E. Install chrome plated steel escutcheons at finished surfaces.

3.07 SCHEDULES:

HANGER ROD (inches)	PIPE SIZE (inches)	HANGER SPACING (feet)
3/8	2 to 1-1/4	6.5
3/8	1-1/2 to 2	10
1/2	2-1/2 to 3	10
5/8	4 to 6	10
7/8	8 to 12	14
5/8	PVC (all sizes)	6
1/2	C.I. Bell and Spigot (or No-Hub) and at Joints	5

**END OF SECTION 23 05 29 HVAC Supports and Anchors**



**SECTION 23 05 53**  
**IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT**

**PART 1 - GENERAL**

1.01 SECTION INCLUDES:

- A. Nameplates.
- B. Tags.
- C. Pipe Markers.

1.02 REFERENCES:

- A. ASME A13.1 - Scheme for the Identification of Piping Systems.

**PART 2 - PRODUCTS**

2.01 NAMEPLATES:

- A. Manufacturers:
  - 1.Brady
  - 2.Seton
  - 3.Carlton.
- B. Description: Laminated three-layer plastic with engraved black letters on light contrasting background color.

2.02 TAGS:

- A. Manufacturers:
  - 1.Brady
  - 2.Seton
  - 3.Carlton.
- B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.
- C. Chart: Typewritten letter size list in anodized aluminum frame.

2.03 STENCILS:

Not used.

2.04 PIPE MARKERS:

A. Manufacturers:

1. Brady
2. Seton
3. Carlton.

B. Color: Conform to ASME A13.1.

C. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

D. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

E. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.

2.05 CEILING TACKS:

A. Manufacturers:

- 1.Brady
- 2.Seton
- 3.Carlton.

B. Description: Steel with 3/4 inch diameter color coded head.

C. Color code as follows:

1. Yellow - HVAC equipment.
2. Red - Fire dampers/smoke dampers.
3. Green - Plumbing valves.

2.06 PAINTING:

A. Manufacturers: Products recognized for pipe application. Paint applied directly to elastomeric insulation shall be made specifically for that purpose.

B. Description: Paint all exposed gas piping. Employ qualified craftsman with a minimum of three years experience in pipe painting.

**PART 3 EXECUTION**

3.01 PREPARATION:

A. Degrease and clean surfaces to receive adhesive for identification materials.

B. Prepare surfaces for painting.

3.02 INSTALLATION:

- A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Install plastic pipe markers in accordance with manufacturer=s instructions.
- D. Install plastic pipe marker complete around pipe in accordance with manufacturer=s instructions.
- E. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.
- F. Identify air handling units with tags.
- G. Identify valves in main and branch piping with tags.
- H. Identify piping, concealed or exposed, with plastic pipe markers. Use tags on piping 3/4 inch diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.
- I. Identify ductwork with stenciled painting. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.
- J. Provide ceiling tacks to locate valves or dampers above T-bar type panel ceilings. Locate in corner of panel closet to equipment.

**END OF SECTION 23 05 53 Identification for HVAC Piping and Equipment**

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**SECTION 23 05 93  
TESTING, ADJUSTING, BALANCING**

**PART 1 - GENERAL**

1.01 DESCRIPTION OF WORK

- A. Extent of work:
1. Extent of testing, adjusting and balancing work is indicated by requirements of this Section, and also by drawings and schedules, and is defined to include, but is not necessarily limited to, air distribution system, and associated equipment and apparatus of HVAC work.
  2. The work consists of setting speed and volume (flow) adjusting facilities provided for systems, recording data, conducting tests, preparing and submitting reports, and recommending modifications to work as required by contract documents.
- B. Component types of testing, adjusting and balancing specified in this Section includes fans, air-conditioning units, ductwork systems.

1.02 QUALITY ASSURANCE

- A. Industry standards: Comply with American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE), National Environmental Balancing Bureau (NEBB) or Associated Air Balance Councils (AABC) recommendations pertaining to measure, instruments, and testing, adjusting, and balancing. Provide an independent Test and Balance by a certified technician or hire HVAC design engineering firm with Professional Engineer and five years experience.

1.03 SUBMITTALS

- A. Comply with Section 01300, Submittals.
- B. Submit certified test report signed by Test and Balance Supervisor who performed TAB work. Include identification and types of instruments used and their most recent calibration data with submission of final test report.
- C. Maintenance data: Include in maintenance manuals, copies of certified test reports.

1.04 JOB CONDITIONS

- A. Do not proceed with testing, adjusting, and balancing work until work has been completed

and is operable. Ensure that there is no latent residual work still to be completed. If Test and Balanced is performed during construction it will be deemed null and void and performed over in presence of Designer at no cost to the Owner and the Contractor shall incur all Designer=s cost for supervision.

- B. Do not proceed until work scheduled for testing, adjusting, and balancing is clean free from debris, dirt, and discarded building materials.

**PART 2 - PRODUCTS**

2.01 PATCHING MATERIALS

- A. Except as otherwise indicated, use same products as used by original Installer for patching holes in insulation, ductwork and housing which have been cut or drilled for test purposes, including access for test instruments, attaching jigs, and similar purposed. At Tester=s option, plastic plugs with retainers may be used to patch drilled holes in ductwork and housings. Do not leave test holes uncovered.

**PART 3 - EXECUTION**

3.01 INSPECTION

- A. Examine installed work and conditions under which testing is to be done to ensure that work has been completed, cleaned and is operable. Do not proceed with TAB work until unsatisfactory conditions have been corrected in a manner acceptable to Tester.
- B. Air balance: The air balance shall include the following air tests in accordance with the following requirements:
  - 1. Test and adjust blower RPM or vane setting to design requirements (within +/- 5% of design requirements).
  - 2. Test and record motor full load amperes.
  - 3. Make pilot tube traverse of main supply ducts and obtain design cfm at fans.
  - 4. Test and record system static pressures, suction and discharge.
  - 5. Test and adjust system for design recirculated air cfm.
  - 6. Test and adjust outside system for design cfm outside air.
  - 7. Test and adjust exhaust air system for design cfm.

- 8. Test and record entering air temperatures of heating and cooling coils (both db and wb of cooling coils).
- 9. Test and record leaving air temperatures of heating and cooling coils (both db and wb of cooling coils).
- 10. Adjust all main supply and return air ducts to proper design cf.
- 11. Adjust all zones to proper design cfm, supply and return.
- 12. Test and adjust each outlet and inlet (diffuser, grille and register) to within +/- 10% of design requirements. Use proportional method of balancing. Do not test each outlet and inlet with hood or similar device by adjusting air flow for static reading. (Testing and adjusting single outlet without proportional balancing will result in unbalance when other outlets and inlets are adjusted).
- 13. Size, type and manufacturer of diffusers, grilles, registers, and tested equipment shall be identified and listed. Manufacturer's ratings on all equipment shall be used to make required calculations.
- 14. Readings and tests of diffusers, grilles, and registers shall include required fpm velocity and test resultant velocity, required cfm and test resultant cfm after adjustments.
- 15. In cooperation with the control manufacturer's representative, setting adjustments of automatically operated dampers to operate as specified, indicated and/or noted.
- 16. Adjust diffusers, grilles, and registers to minimum drafts in all areas.
- 17. Prepare reports of test results, including instrumentation calibration reports, in format recommended by applicable standards.
- 18. Patch holes in insulation, ductwork and housings, which have been cut or drilled for test purposes, in manner recommended by original Installer.
- 19. Mark equipment setting, including damper control positions, valve indicators, fan speed control levers, and similar controls and devices, to show final settings at completion of TAB work. Provide markings with paint or other suitable permanent identification materials.

**END OF SECTION 23 05 93 Testing Adjusting, Balancing**

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**SECTION 23 07 00**  
**HVAC INSULATION**

**PART 1 - GENERAL**

1.01 SCOPE

- A. Piping system insulation: Cooling coil condensate, condenser water piping inside building, etc.
- B. Ductwork system insulation.

1.02 QUALITY ASSURANCE

- A. Flame/smoke ratings. Provide composite HVAC insulation (insulation, jackets, coverings, sealers, mastics and adhesives) with Flame-Spread rating of 25 or less, and smoke-developed rating of 50 or less, as tested by ASTM E 84 (NFPA 225) method for ductwork and equipment. Flame-Spread of 25 or less and smoke-developed rating of 150 or less for Pipe Insulation and Fittings.

1.03 SUBMITTALS

- A. Product data: Submit manufacturer=s specifications and installation instructions for each type of HVAC insulation. Submit schedule showing manufacturer=s product number, thickness, and furnished accessories for each HVAC system requiring insulation.
- B. Certifications: Submit manufacturer=s certifications to show compliance with these specifications and governing regulations. Include proof of compliance for test of products for fire rating, corrosiveness, and compressive strength.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver insulation, coverings, cements, adhesives, and coatings to site in containers with manufacturer=s stamp or label affixed, showing fire hazard ratings or products.
- B. Protect insulation against dirt, water, chemical or HVAC damage. Do not install damaged insulation.

**PART 2 - PRODUCTS**

2.01 MANUFACTURER'S

- A. KNAUF Fiberglass
- B. Armstrong World Industries, Inc.
- C. Johns-Mansville Corporation

- D. Owens-Corning Fiberglass Corporation
- E. Pittsburg Corning Corporation.

## 2.02 PIPE INSULATION MATERIALS

- A. Fiberglass pipe insulating: ASTM C547, Class 1 for piping where highest temperature does not exceed 450EF.
- B. Cellular glass pipe insulation: ASTM C552, Type II, Class 2.
- C. Polyethylene: ASTM C-177 and D-1622.
- D. Jackets and piping insulation: ASTM C921, Type I for piping with temperatures below ambient, Type II for piping with temperatures above ambient. Type I may be used for all piping at Installers option. All jackets, piping insulation, and insulation sealing and encasing components shall comply with local, state, and county smoke and flame-spread requirements.
  - 1. Encase pipe fittings insulation with one-piece pre-molded or job sie fabricated fitting covers, fastened as per manufacturer=s recommendations. Provide one coat of hardcast over each fitting cover.
  - 2. Encase exterior piping insulation with aluminum jacket with weather-proof construction.
- E. Staples, bands, wires, and cement: As recommended by insulation manufacturer for applications indicated.
- F. Adhesives, sealers, and protective finishes: As recommended by insulation manufacturer for applications indicated.

## 2.03 DUCTWORK INSULATION MATERIALS

- A. Rigid fiberglass ductwork insulation: ASTM C612, Class 1 (non-load bearing) where insulation is not subjected to compressive loading, Class 2 (load bearing) where insulation is subjected to compressive loading; except provide higher Class where indicated.
- B. Flexible fiberglass ductwork insulation: ASTM C553, Type I, Class B-4.
- C. Cellular glass ductwork insulation: ASTM C552, Type I.
- D. Jackets for ductwork insulation: ASTM C921, Type I for ductwork with temperatures below ambient; Type II for ductwork with temperatures above ambient.

- E. Ductwork insulation accessories: Provide staples, bands, wires, tape, anchors, corner angles and similar accessories as recommended by insulation manufacturer for applications indicated.

2.04 EQUIPMENT INSULATION MATERIALS

- A. Rigid fiberglass equipment insulation: ASTM C612.
- B. Flexible fiberglass equipment insulation: ASTM C553, Type 1, Class B-4.
- C. Cellular glass equipment insulation: ASTM C533, Type 1, Block.
- D. Jacketing material for equipment insulation: Provide pre-sized glass cloth jacketing materials, not less than 7.8 ounces per square yard, except as otherwise indicated.
- E. Equipment insulation compounds: Provide adhesives, cements, sealers, mastics and protective finishes as recommended by insulation manufacturer for applications indicated. All equipment insulation compounds shall comply with local, state, and county smoke and flame-spread requirements.
- F. Equipment insulation accessories: Provide staples, bands, wire, wire netting, tape corner angles, anchors, stud pins and metal covers as recommended by insulation manufacturer for applications indicated.

**PART 3 - EXECUTION**

3.01 HVAC PIPING SYSTEM INSULATION

- A. Insulate all refrigerant piping with 1 ½" insulation

3.02 DUCTWORK SYSTEM INSULATION

- A. Rectangular low pressure ductwork shall be externally insulated downstream and upstream of air handler unit unless otherwise indicated on drawings.
- B. Insulation of ductwork exposed to weather: Protect outdoor insulation from weather by installing outdoor protective sheet metal jacket with finish. Jacket shall be made weather tight and sealed.
- C. Rectangular and round externally insulated ductwork. Insulate the following with R-6, 3/4 lb. density fiberglass with vapor barrier.
  - 1. Outdoor air ductwork.
  - 2. Supply air duct.
  - 3. Return air ductwork.

- 4. Exhaust air ductwork within 10' of roof.
- 5. Bells of supply diffusers.
- 6. HVAC plenums and unit housings not pre-insulated at factory.
- D. Hot ductwork (above ambient temperature): Insulate range and hood exhaust ductwork, with 2" thick flexible fiberglass.
- E. Ductwork in an attic shall have R-8 insulation.

3.03 EQUIPMENT INSULATION

- A. Cold equipment (below ambient temperature): Insulate HVAC equipment to have 1/2" thick fiberglass with vapor barrier.

3.04 INSTALLATION OF PIPING INSULATION

- A. Install insulation products in accordance with manufacturer=s written instructions, and in accordance with recognized industry practices to ensure that insulation serves its intended purpose.
- B. Install insulation on pipe systems subsequent to testing acceptance of tests.
- C. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with single cut piece to complete run. Do not use cut pieces or scraps abutting each other.
- D. Clean and dry pipe surfaces prior to insulating. Butt insulation joints firmly together to ensure complete and tight fit over surfaces to be covered.
- E. Maintain integrity of vapor-barrier jackets on pipe insulation, and protect to prevent puncture or other damage.
- F. Cover valves, fittings and similar items in each piping system with equivalent thickness and composition of insulation as applied to adjoining pipe run. Install factory molded, pre-cut or job fabricated units (at Installer=s option) except where specific form or type is indicated.
- G. Extend piping insulation without interruption through walls, floors and similar piping penetrations, except where otherwise indicated.
- H. Install protective metal shields and insulated inserts wherever needed to prevent compression of insulation.

- I. Pipe hanger insulation inserts: Butt pipe insulation against pipe hanger insulation inserts. For hot pipes, apply 3" wide vapor barrier tape or band over the butt joints. For cold piping, apply wet coat of vapor barrier lap cement on butt joints and seal joints with 3" wide vapor barrier tape or band.

3.05 INSTALLATION OF DUCTWORK INSULATION

- A. Install insulation products in accordance with manufacturer=s written instructions, and in accordance with recognized industry practices to ensure that insulation serves its intended purpose.
- B. Install insulation materials with smooth and even surfaces.
- C. Clean and dry ductwork prior to insulating. Butt insulation joints firmly together to ensure complete and tight fit over surfaces to be covered.
- D. Maintain integrity of vapor-barrier on ductwork insulation, and protect it to prevent puncture and other damage.
- E. Butt external ductwork insulation up to wall, fasten insulation to ductwork at wall as to provide airtight fitting. Do not fasten insulation to wall.
- F. Ductwork exposed to weather: Protect outdoor insulation from weather by installing outdoor protective finish aluminum jacketing as recommended by manufacturer, or as indicated on drawings.
- G. Corner ductwork: Except for oven and hood exhaust duct insulation, install corner angles on external corners of insulation on ductwork in exposed finished spaces before covering with jacketing.

3.06 INSTALLATION OF EQUIPMENT INSULATION

- A. Install insulation materials with smooth and even surfaces and on clean and dry surfaces. Redo poorly fitted joints. Do not use mastic or joint sealer as filler for gapping joints and excessive voids resulting from poor workmanship.
- B. Maintain integrity of vapor-barrier on equipment insulation and protect it to prevent puncture and other damage.

3.07 PROTECTION AND REPLACEMENT

- A. Replace damaged insulation which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.
- B. Protection: Insulation Installer shall advise Contractor of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

**END OF SECTION 23 07 00 HVAC Insulation**

**SECTION 23 31 13  
METAL DUCTWORK**

**PART 1 - GENERAL**

1.01 DESCRIPTION OF WORK

- A. Extent of metal ductwork is indicated on drawings or specified here within.
- B. Refer to Section 23 07 00 for exterior insulation of metal ductwork; not work of this section.
- C. Refer to Section 23 05 93 for testing, adjusting, balance of metal ductwork systems, not work of this section.

1.02 QUALITY ASSURANCE

- A. Codes and standards:
  - 1. SMACNA standards: Comply with SMACNA=s AHVAC Duct Construction Standards, Metal and Flexible@ for fabrication and installation of metal ductwork or comply with ASHRAE Handbook, Equipment Volume, Chapter 1, Duct Construction@, for fabrication and installation of metal ductwork.
  - 2. NFPA compliance: Comply with NFPA 90A Standard for the Installation of Air Conditioning and Ventilating Systems@ and NFPA 90B Standard for the Installation of Warm Air Heating and Air Conditioning Systems@.
- B. Field reference manual: Have available for reference at project field office, copy of SMACNA AHVAC Duct Construction Standards, Metal and Flexible@.

1.03 SUBMITTALS

- A. Comply with Section 013000. Product data: Submit manufacturer=s technical product data and installation instructions for metal ductwork materials and products.
- B. Record drawings: At project closeout, submit record drawings of installed metal ductwork products, in accordance with requirements of Section 013000.
- C. Shop drawings: Submit 1/8" = 1'0" dimensioned layouts of ductwork showing both the accurately scaled ductwork and its relation to space enclosure. Show modifications of indicated requirements, made to conform to local shop practice, and how those modifications ensure that free area, materials, rigidity are not reduced.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Protection: Protect shop-fabricated and factory-fabricated ductwork, accessories and purchased products from damage during shipping, storage and handling. Prevent end damage and prevent dirt and moisture from entering ducts and fittings.
- B. Storage: Where possible, store ductwork inside and protect from weather. Where necessary to store outside, store above grade and enclose with waterproof wrapping.

**PART 2 - PRODUCTS**

2.01 DUCTWORK MATERIALS

- A. Exposed ductwork material: Where ductwork is indicated to be exposed to view in occupied spaces, provide materials which are free from visual imperfections, including pitting, seam marks, roller marks, stain and discolorations, and other imperfections, including those which would impair painting.
- B. Sheet metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ASTM A 527, lock forming quality; with G90 zinc coating in accordance with ASTM A 525; and mill phosphatized for exposed locations.

2.02 MISCELLANEOUS DUCTWORK MATERIALS

- A. Provide miscellaneous materials and products of types and sizes indicated and, where not otherwise indicated, provide type and size required to comply with ductwork system requirements including proper connection of ductwork and equipment.
- B. Fittings: Provide radius type fittings fabricated of multiple sections with maximum 15 deg change of direction per section. Unless specifically detailed otherwise, use 45 deg laterals and 45 deg elbows for branch takeoff connections. Where 90 deg branches are indicated, provide conical type tees.
- C. Duct sealant: Non-hardening, non migrating mastic or liquid elastic sealant, type applicable for fabrication/installation detail, as compounded and recommended by manufacturer specifically for sealing joints and seams in ductwork.
- D. Duct cement: Non-hardening, non-migrating mastic or liquid neoprene based cement, type applicable for fabrication/installation detail, as compounded and recommended by manufacturer specifically for cementing fitting components, or longitudinal seams in ductwork.
- E. Ductwork support material: Except as otherwise indicated, provide hot-dipped galvanized steel fasteners, anchors, rods, 3" wide straps, trim and angles for support or ductwork. Rods shall be minimum 1/4" diameter and straps shall be minimum 1/8" thick x 3" wide



for ducts 24" and 36" x 14" and smaller. For ducts larger provide 3/8" diameter rod and 3/16" x 3" wide straps.

1. Except where space is indicated as High Humidity area, interior support materials of not less than 1/4" diameter or 3/16" thickness may be plain (not galvanized).
  2. For exposed stainless steel ductwork, provide matching stainless steel support materials.
- F. Flexible ducts: Either spiral-wound spring steel with flameproof vinyl sheeting, or corrugated aluminum; complying with UL 181.
1. Where installed in unconditional spaces other than return air plenums, provide 1" thick continuous flexible fiberglass sheath with vinyl vapor barrier jacket.
- G. Flexible ducts: Exterior reinforced laminated vapor barrier, 1-1/2" thick fiber glass insulation (K = .25 @ 75 degrees F), encapsulated spring steel wire helix and impervious, smooth non-perforated interior vinyl liner. Individual lengths of flexible ducts shall contain factory fabricated steel connection collars.

### 2.03 FABRICATION

- A. Shop fabricate ductwork in 4, 8, 10 or 12 foot lengths, unless otherwise indicated required to complete runs. Preassemble work in shop to greatest extent possible, as to minimize field assembly of systems. Disassemble systems only to extent necessary for shipping and handling. Match-mark sections for reassembly and coordinated installation.
- B. Shop fabricate ductwork of gages and reinforcement complying with SMACNA (HVAC Duct Construction Standards) or shop fabricate ductwork of gauges and reinforcement complying with ASHRAE Handbook, Equipment Volume, Chapter 1, Duct Construction.
- C. Fabricate duct fittings to match adjoining ducts, and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with center-line radius equal to associated duct width; and fabricate to include turning vanes in elbows where shorter radius is necessary. Limit angular tapers to 30 deg for contracting tapers and 20 deg for expanding tapers.
- D. Fabricate ductwork with accessories installed during fabrication to the greatest extent possible.
- E. Fabricate ductwork with duct liner in each section of duct (where indicated). Laminate liner to internal surfaces of duct in accordance with instructions by manufacturers of lining and adhesive, and fasten with HVAC fasteners.

2.04 FACTORY-FABRICATED LOW PRESSURE DUCTWORK

- A. At Installer=s option, provide factory-fabricated duct and fittings, in lieu of shop-fabricated duct and fittings.
- B. Material: Galvanized sheet steel complying with ASTM A 527, lock forming quality, with ASTM A %25, G90 zinc coating, mill phosphatized.
- C. Gage: 28-gauge minimum for round and oval ducts and fittings, 4" through 24" diameter.
- D. Elbows: One piece construction for 90 deg and 45 deg elbows 14" and smaller. Provide multiple gore construction for larger diameters with standing seam circumferential joint.
- E. Divided flow fittings: 90 deg tees, constructed with saddle tap spot welded and bonded to duct fitting body.
- F. Available manufacturers: Subject to compliance with requirements, manufacturers offering factory-fabricated ductwork which may be incorporated in the work include, but are not limited to, the following:
  - 1. Semco Manufacturing, Inc.
  - 2. United Sheet Metal Division
  - 3. United McGill Corp.

2.05 KITCHEN EXHAUST DUCTS

- A. Fabricate kitchen exhaust ducts and supports, used for smoke and vapor removal for cooking equipment, of 16-ga minimum galvanized steel where concealed, and of 18-ga minimum stainless steel where exposed. For duct construction, comply with SMACNA AHVAC Duct Construction Standards@, and NFPA 96 Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment@.

**PART 3 - EXECUTION**

3.01 INSPECTION

- A. Examine areas and conditions under which metal ductwork is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 INSTALLATION OF METAL DUCTWORK

- A. Assemble and install ductwork in accordance with SMACNA Standards including duct sealer for joints and seams which will achieve air-tight (95% leakage for systems rated 3" and under) and noiseless (no objectionable noise) systems, capable of performing each indicated service. Install each run with minimum number joints. Align ductwork accurately at connections, within 1/8" misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers and anchors to type which will hold ducts true-to-shape and to prevent buckling. Support vertical ducts at every floor.
- B. Field fabrication: Complete fabrication of work at project as necessary to match shop-fabricated work and accommodate installation requirements.
- C. Routing: Locate ductwork runs, except as otherwise indicated, vertically and horizontally and avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, details and notations or, if not otherwise indicated, run ductwork in shortest route which does not obstruct usable space or block access for servicing building and its equipment. Hold ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building. Limit clearance to 2" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork for 1" clearance outside of insulation. Wherever possible in finished and occupied spaces, conceal ductwork from view, by locating in HVAC shafts, hollow wall construction or above suspended ceilings. Do not erase horizontal runs in solid partitions, except as specifically shown. Coordinate layout with suspended ceiling and lighting layouts and similar finished work.
- D. Electrical equipment spaces: Do not route ductwork through transformer vaults, electrical panel rooms and their electrical equipment spaces and enclosures.
- E. Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same gauge as duct. Overlap opening on four sides by at least 1-1/2". Fasten to duct and substrate.
  - 1. Where ducts pass through fire-rated or smoke-rated floors, walls, or partitions, provide fire-stopping between duct and substrate, in accordance with requirements of Division-7 Section Fire-Stopping. Provide fire dampers as required by all local, state or federal codes.
- F. Coordination: Coordinate duct installations with installation of accessories, dampers, coil frames, equipment, controls and other associated work of ductwork system.
- G. Installation: Install metal ductwork in accordance with SMACNA AHVAC Duct Construction Standards@ and as described on the drawings.

### 3.03 INSTALLATION OF FLEXIBLE DUCT

- A. Maximum length: For any duct run using flexible ductwork, do not exceed (3'0") extended length.
- B. Installation: Install in accordance with Section III of SMACNA=s AHVAC Duct Construction Standards, Metal and Flexible@.
- C. Flexible ducts: Supported at or near mid-length with 2" wide 28 ga steel hanger collar attached to the structure with an approved duct hanger. The maximum length will be seven feet and can be used at the terminal ends only, except that flexible ducts properly installed may be used to cross seismic joints without offsets.

#### 3.04 INSTALLATION OF KITCHEN EXHAUST DUCTS

- A. Fabricate joints and seams with continuous welds for watertight construction. Provide for thermal expansion of ductwork through 2,000 deg F (1,093 deg C) temperature range. Install without dips or traps which may collect residues, except where traps have continuous or automatic residue removal. Provide access openings at each change in direction, located on sides of duct 1-1/2" minimum from bottom, and fitted with grease-tight covers of same material as duct.

#### 3.05 EQUIPMENT CONNECTIONS

- A. Connect metal ductwork to equipment as indicated, provide flexible connection for each ductwork connection to equipment mounted on vibration isolators, and/or equipment containing rotating machinery. Provide access doors as indicated or required.

#### 3.06 ADJUSTING AND CLEANING

- A. Clean ductwork internally, unit by unit as it is installed, of duct and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting or cause paint deterioration.
- B. Strip protection paper from stainless ductwork surfaces, and repair finish wherever it has been damaged.
- C. Temporary closure: At ends of ducts which are not connected to equipment of air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering which will prevent entrance of duct and debris until time connections are to be completed.
- D. Balancing: Refer to Section 230593 Testing, Adjusting and Balancing for air distribution balancing of metal ductwork; not work of this section. Seal any leak in ductwork that became apparent in balancing process.

### **END OF SECTION 23 31 13 Metal Ductwork**

**SECTION 26 00 00**  
**ELECTRICAL - GENERAL PROVISIONS**

**PART 1 - GENERAL**

1.1 GENERAL CONDITIONS

- A. The general provisions of the Contract including General and Supplementary Conditions, Division 1 General Requirements, and Instructions to Bidders apply to the Work included in this Division.

1.2 WORK INCLUDED

- A. Work covered by this specification shall include furnishing all labor, materials, equipment and services required to construct and install the complete electrical system shown on accompanying plans and specified herein.
- B. This work shall include: the general layout of the complete electrical system; arrangement of feeders, circuits, outlets, switches, controls, panelboards, transformers, service equipment, fixtures, and other work. No rough-in or connection, etc., for Mechanical Equipment shall be done until coordination is completed with Division 23 Contractor.
- C. This work shall include electrical demolition to support all other trades. See architectural, structural and mechanical plans and specifications to determine complete scope. Circuits remaining but disrupted by demolition shall be repaired as necessary to keep them operational. Electrical being removed shall be removed to the fullest extent possible as to not cause additional damage to the building. All remaining electrical panels, circuits, feeders, etc... shall be thoroughly traced in the field to determine actual loads. Provide new, updated, accurate panel schedules and nameplates based on complete field verification.

1.3 RELATED WORK

- A. The Contractor shall be familiar with any work specified elsewhere in these specifications. He shall perform this work as if specified herein.

1.4 PERMITS AND INSPECTIONS

- A. The Contractor shall give all necessary notices; obtain all permits, and pay all governmental taxes, fees and other costs in connection with his work; file all necessary plans; prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction; obtain required Certificates of Inspection for his work and deliver same to the Architect-Engineer before request for acceptance and final payment of work.
- B. Contractor shall include in the work, without extra cost to the Owner, all labor, materials, services, apparatus, drawings, etc. necessary to comply with all laws,

ordinances, rules and regulations, whether or not shown on the drawings and/or in the specifications.

## 1.5 CODES AND STANDARDS

A. The following specifications and standards, of issues listed below, but referred to thereafter by basic designation only, form part of these specifications:

1. National Electrical Code (NEC) NFPA-70.
2. National Fire Protection Association's Recommended Practices.
3. Local, City and State Codes and Ordinances.
4. National Electrical Safety Code.
5. Underwriters Laboratories, Inc. (UL).
6. Illuminating Engineering Society (IES).
7. Institute of Electrical and Electronic Engineers (IEEE).
8. Insulated Power Cable Engineers Association.
9. National Electrical Manufacturers Association (NEMA).
10. American National Standards Institute (ANSI).
11. American Society for Testing Materials (ASTM).
12. State Fire Prevention Code.
13. Occupational Health Safety Act (OSHA).
14. Service Requirements of serving utility company.
15. Life Safety Code - NFPA 101.
16. Americans with Disabilities Act (ADA)

The latest specifications and standards available shall be used for the above.

## 1.6 REVIEW OF MATERIALS

- A. It is the intent of these Specifications to establish quality standards of materials and equipment installed. Therefore, specific items are identified by manufacturer, trade name or catalog designation.
- B. Submit manufacturer's catalog sheets and/or shop drawings covering all phases of work included in this contract.
- C. Submittals shall be arranged in sets and bound. Material shall be organized into indexed sections corresponding to specification sections. No loose sheets will be acceptable. All data shall be submitted at one time. Partial submittals will not be accepted for review.
- D. All submittals shall bear written certification to the effect that the Contractor has examined them and found them to be in accordance with Specifications and to be dimensionally correct with reference to available space and to related trades. Each submittal shall be signed and dated by the Division 16 Contractor.
- E. If submittals are transmitted in pdf format, they shall be submitted as a single pdf containing all electrical sections. If the submittal exceeds one hundred sheets, a

single hard copy shall be provided to the engineer for review and records. This hard copy will remain with the engineer.

- F. Submittals are required even when equipment being furnished is exactly as specified. Each sheet of submitted data shall be thoroughly edited to clearly indicate which features and/or options are being proposed.
- G. Substitution of equipment shall be in accordance with Supplementary General Conditions of this Specification.
- H. Any proposed substitutions of equipment shall be accompanied by shop drawings showing revised equipment layouts and wiring diagrams. Where substituted equipment furnished requires use of larger, more, or differently arranged connections, such connections shall be installed to the complete satisfaction of Architect-Engineer without additional cost to Owner.
- I. Should a substitution be accepted and subsequently proven unsatisfactory for the service intended within the warranty period, the contractor shall replace this material or equipment with that as originally specified, or corrected as directed by the Architect-Engineer.
- J. Where substitutions alter the design or space requirements indicated on the drawings, the Contractor shall include all items of cost for the revised design and include cost of all allied trades involved.
- K. Acceptance or rejection of the proposed substitutions shall be subject to the approval of the Architect-Engineer. If requested by the Architect-Engineer, the Division Contractor shall submit for inspection samples of both the specified and proposed substitute items.
- L. In all cases where substitutions are permitted, the Contractor shall bear any extra cost of evaluating the equality of the material and the equipment to be installed.
- M. The Contractor shall submit to the Architect-Engineer, detailed dimensioned shop drawings covering all items of electrical equipment. No equipment should be put into manufacture or ordered until these shop drawings or brochures have been reviewed by the Architect-Engineer.
- N. In the event resubmittal is required, the Contractor shall revise the shop drawings as directed by the Architect-Engineer. The Contractor shall then resubmit the corrected shop drawings to the Architect-Engineer for final review.
- O. Upon completion of the Project, this Contractor shall prepare and deliver to the Architect-Engineer 1 set of reproducible "RECORD SET" drawings, showing actual installed locations of all electrical conduits, ducts, and cables outside and inside of the buildings, including the location of all underground junction boxes, pull boxes, or handholes. Make all necessary field measurements during the installation of the electrical work.

## 1.7 DEVIATIONS

- A. The drawings, which constitute an integral part of this contract, shall indicate the general layout of the complete electrical systems; arrangement of feeders, circuits, outlets, switches, controls, panelboards, transformers, service equipment, fixtures and other work.
- B. Field verification of scale dimensions on the drawings is directed since actual locations, distances, and levels will be governed by actual field conditions.
- C. The Contractor shall check Architectural, structural, plumbing, and heating and ventilating drawings to avert possible installation conflicts. Should drastic changes from original drawings be necessary to resolve such conflicts, the Contractor shall notify the Architect-Engineer and secure written approval and agreement on necessary adjustments before the installation is started.
- D. The drawings may be superseded by later revised or detailed drawings or specification addenda prepared by the Architect-Engineer, and the Contractor shall conform to all reasonable changes without extra cost to the Owner. All items not specifically mentioned in the specifications or noted on the drawings, but which are obviously or normally necessary to make a complete working installation, shall be included.

## 1.8 SITE UTILITIES

- A. Locations and elevations of various utilities, included within the scope of this work, have been obtained from existing plans and/or other substantially reliable sources, and are offered as a general guide only without guarantee as to accuracy. This Contractor shall examine the Site and verify to his own satisfaction the locations and elevations of all utilities and shall adequately inform himself of their relations to the work before entering into contract.
- B. Voltage that appears on the drawings and elsewhere in these Specifications has been obtained from the serving utility company. Before ordering equipment and starting the job, this Contractor shall verify the voltage with the utility company. If voltage differs from that noted on the drawings and in the specifications, the Architect-Engineer shall be notified at once. If the Architect-Engineer is not notified before equipment is ordered or construction is started, this contractor shall provide an acceptable and operable system at no additional cost to the Owner.
- C. Exterior utilities shall include all conduit and appurtenances outside of the building or as shown on the drawings. Unless otherwise noted, utilities shall include complete tie-in with utility lines at no extra cost to the Owner. The Contractor shall pay all costs required by utility company pertaining to construction and tie-in including any required utility extensions. Any deposits required for permanent service will be paid by the Owner.

## PART 2 - PRODUCTS

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- 2.1 All material and equipment shall be new and of the best quality normally used in good commercial practice, being products of reputable manufacture.

**PART 3 - EXECUTION**

- 3.1 The Owner shall retain the right to reject any materials and/or workmanship which is not in accordance with those specified, either before or after installation.

**END OF SECTION**

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**SECTION 26 05 00  
COMMON WORK RESULTS FOR ELECTRICAL**

**PART 1 - GENERAL**

1.1 GENERAL CONDITIONS

- A. The general provisions of the Contract including General and Supplementary Conditions, Division 1 General Requirements, and Instructions to Bidders apply to the Work included in this Division.

1.2 LOCAL CONDITIONS

- A. Unless otherwise required or specified under another section of these Specifications, cutting and patching will be performed by the General Contractor. This Contractor shall furnish sketches showing locations and sizes of all openings, chases, etc., required for the installation of his work.
- B. This Contractor shall furnish and locate sleeves and inserts required before floors and walls are built or he shall be responsible for the cost of cutting and patching required where such sleeves and inserts are not installed or where incorrectly located. This Contractor shall do all drilling required for installation of his hangers.
- C. Any and all penetrations of fire and/or smoke rated walls, partitions, floors, and/or ceilings shall be accomplished in such a manner as to maintain the integrity of the fire rating and to meet U.L. requirements. Any and all such penetrations shall be done in a manner acceptable to the local fire officials. Any and all penetrations shall be sealed with a material such as Dow Corning Fire Stop 2000 or other material as may be directed by the local fire official. Penetrations of four-hour rated walls, partitions, ceilings, and/or floors will not be permitted under any circumstances. Contractor shall carefully plan work in advance. Refer to architectural drawings for locations and ratings of various building elements.
- D. No cutting shall be permitted to any of the structural members without the written permission of the Architect-Engineer.
- E. Where openings are cut to permit installation of work, or cut to repair or remodel, any defects that may appear up to expiration of guarantee, patching shall be done by the trade whose work is disturbed, but shall be paid for by the Contractor cutting openings or causing the damage.
- F. The General Contractor shall furnish all foundations and supports required for electrical equipment. The Electrical Contractor shall furnish an approved layout of bases and supports to the General Contractor.
- G. In general, all floor mounted equipment shall be installed on raised concrete bases. Concrete bases shall be not less than 6" high unless otherwise noted, and shall be poured in forms built of new dressed lumber. Foundation corners shall be neatly chamfered by means of sheet metal or triangular wood strips nailed to the form. Foundation bolts shall be placed in forms when concrete is poured; bolts shall be

correctly located by means of templates. Allow 1" below equipment bases for alignment and grouting. After grouting, the forms shall be removed and the surface of the foundations shall be hand rubbed with carborundum.

- H. The Electrical Contractor shall give full cooperation to other trades, furnishing, in writing, to the Architect-Engineer, any information necessary to permit work of all trades to be installed satisfactorily and with the least possible interference or delay.
- I. Where work of this Contractor will be installed close to work of other trades, or where there is evidence that work of this Contractor will interfere with work of other trades, this Contractor shall assist in working out space conditions to make satisfactory adjustment. If a Contractor installs his work before coordinating with other trades, he shall make necessary changes in his work to correct the condition without extra charge.
- J. This Contractor shall keep his work area clean at all times. All scraps and debris shall be removed from work area. If this Contractor does not maintain his area, the General Contractor shall clean this area and back-charge this Contractor.
- K. It shall be the responsibility of each bidder to visit the project site to acquaint himself with existing conditions prior to submitting a bid.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

- A. Each item of equipment furnished under these Specifications is to be essentially the standard product of the manufacturer; however, component parts of equipment need not be products of one manufacturer.
- B. All material and equipment shall be new and of the best quality normally used in good commercial practice, being products of reputable manufacture. Each major component shall bear a nameplate stating name and address of the manufacturer and catalog number or designation. All materials shall be of the manufacturer's latest design standard, and bear Underwriters Laboratories, Inc. Label and the manufacturer's trademark.
- C. Where items of equipment and/or apparatus come under the following general headings, all of the equipment shall be from the same manufacturer:

Circuit breakers, panelboards, safety switches, switchgear.

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- A. This Contractor shall provide copies of prefunctional, start-up checklists on all equipment installed under division 16 (ie. Panelboards, transformers, feeders,

grounding, etc...) to the commissioning team for its information and reference prior to the start of any fieldwork or operation of that piece of equipment.

- B. All electrical construction work shall be installed under the direction of a competent supervisor who will be at the job site at all times when electrical installations are being made.
- C. Installing Contractor will be held responsible for damage to other work resulting from negligence of his workmen. Such repairs shall be performed by the trade originally accomplishing the work but at the expense of this Contractor.
- D. This Contractor shall utilize only competent and skillful workmen in handling and installing equipment specified.
- E. Installation shall be carried out in such a manner that the many components will function as a complete workable system including any accessories required to accomplish such installation. Equipment shall be left properly adjusted and in satisfactory working order. Work is to be executed in conformity with best acceptable standard practices with the equipment being installed to allow for maximum accessibility and best appearance. Installation shall be such that future installations and expansion can be made with a minimum of expenditure.
- F. Where possible, work must be scheduled for accomplishment during periods acceptable to the Owner, but when such scheduling is not feasible, work shall be executed at night or over week ends. No additional compensation will be allowed for overtime.
- G. Apparatus which is too large to permit access through stairways, doorways, or shafts shall be brought to the job site by the contractor involved and put in place before the closing of the structure.
- H. The Electrical Contractor shall be responsible for the protection of electrical apparatus from damage and the elements. This shall include the erection of temporary shelters, cribbing, and the covering of apparatus in incompleated areas of buildings with tarpaulins. Failure to comply with the foregoing by the contractor to the satisfaction of the Architect-Engineer will be sufficient cause for rejection of the piece of apparatus in question.
- I. Chases, recesses, and other openings required for the location of conduits or equipment in new construction shall be provided by the General Contractor. This Contractor shall advise the General Contractor of the size and locations, and furnish all necessary drawings required for his work in sufficient time to allow for provision of chase.
- J. After installation is complete, and at such time as the Architect-Engineer may direct, this Contractor shall conduct an operating test for approval. Equipment shall be demonstrated to operate in accordance with the requirements of this Specification. Test shall be performed in the presence of the Architect-Engineer or authorized representative. This Contractor shall furnish instruments and personnel required for the test and Owner will furnish necessary electrical power.

- K. Perform an insulation test on each feeder utilizing a 500V 'Meggar' tester. The test shall be performed with the feeder open at both ends. The test shall be performed for each phase to ground including neutral and each phase to phase. Record these values and supply to the Engineer for approval and include in the operation and maintenance manual.
  - L. The Contractor shall furnish a written certificate guaranteeing materials, equipment, and labor furnished to be free of defects for a period of 1 year, except where otherwise indicated, from and after the date of final acceptance of the work by the Owner, and further agrees that if defects appear within stipulated guaranty period same shall be replaced or made good without charge. (Exception: Lighting fixture lamps.)
- 3.2 OPERATING AND MAINTENANCE MANUALS
- A. Within three(3) weeks of final submittal approval, deliver to the Architect, for the Commissioning Team's use, three (3) preliminary operating and maintenance manuals covering all equipment and systems installed by this Division. This preliminary operating and maintenance manual shall be in final format and shall be as complete as possible.
  - B. Deliver to the Architect, for the Owner's use, three (3) complete final operating and maintenance manuals covering all equipment and systems installed by this Division. These shall be delivered at final closeout.
  - C. Include parts lists, wiring diagrams, test results, and operating instructions for all operating equipment as well as approved submittals.
  - D. Brochures shall be bound in hard back three ring binder and tab indexed. Label front cover and back spline indicating project name. Include page showing date and local responsible vendors with addresses and telephone numbers for furnishing parts and equipment information.
- 3.3 TEST AND INSPECTION REPORTS
- A. Provide typewritten reports to Owner's representative indicating time, personnel involved and other pertinent data for testing of fire alarm system and other special systems.
  - B. Provide copies of all test or inspection reports by public agencies for electrical system.
- 3.4 Where installations are to be made "in accordance with manufacturer's recommendations", it shall be the responsibility of this Contractor to obtain, and maintain on file at the project site, a copy of said recommendations.

- 3.5 The Project Manual and project drawings are to be used together to describe the project. Any item contained in either shall be considered as being contained in both. In the event of discrepancies or conflicts, this contractor shall immediately notify the Architect-Engineer, in writing.
- 3.6 PAINTING:
- A. Provide a prime coat of paint for all supports, hangers, frames and other materials not having a factory-applied finish.
  - B. Where factory-applied finishes become scratched or chipped, repair surfaces utilizing "touch up" materials obtained from the manufacturer.
- 3.7 Mounting heights indicated on the drawings are the centerline height of the outlet or device above the finished floor. Where outlets are indicated to be installed above counter tops, coordinate with millwork drawings to ensure that there will be no conflicts with coverplates and back splashes.
- 3.8 EXCAVATION AND BACKFILL
- A. Provide all trenching and backfill as required for the placement of work required under this Division.
- 3.9 DEMOLITION
- A. Remove existing panelboards and/or other devices that are not to be reused and all exposed conduit and surface mounted boxes. Where conduit is concealed and boxes are flush in walls or ceilings, remove devices and conductors and provide blank covers on boxes.
  - B. Remove all electrical connections to all HVAC equipment which is to be removed or relocated.
  - C. Where existing lighting fixtures, receptacles, switches, etc., are removed, remove all associated conductors. Remove all associated conduit, outlet boxes, etc., insofar as practical without causing damage to the building. Provide blank covers on all outlet boxes, junction boxes, etc., which cannot be removed. Repair existing circuitry as required to provide continuity to all remaining outlets.
  - D. Provide new directory in each panelboard to reflect actual loads served at the completion of construction/renovation.
  - E. Provide electrical demolition as required to support architectural and mechanical demolition.
- 3.10 MAINTENANCE LOGS
- A. The Contractor shall maintain an appropriate maintenance log, where applicable, of all interim maintenance performed on all started-up equipment so that the manufacturer's warranties are not voided prior to the equipment being turned over to

the Owner. This log shall be submitted to the Owner when the equipment is officially released to the Owner.

**END OF SECTION**



**SECTION 26 05 19  
ELECTRICAL POWER CONDUCTORS AND CABLES**

**PART 1 - GENERAL**

- 1.1 All wire and cable for feeder circuits shall conform to the latest requirements of the current edition of the NEC and shall meet all ASTM Specifications. Wire and cable shall be new manufacture; shall have size, grade of insulation, voltage and manufacturer's name permanently marked on outer covering at regular intervals; shall be delivered in complete coils or reels with identifying size and insulation tags.
- 1.2 Wire and cable shall be suitably protected from weather and damage during storage and handling and shall be in first- class condition when installed. Conductors shall be soft-drawn copper with insulation and outer covering as noted. Conductor sizes shall be Standard American Wire Gage sizes.

**PART 2 - PRODUCTS**

- 2.1 Insulation on low voltage conductors shall be Type THW or THWN. All 600-volt conductors in conduits or other raceways where encased in concrete on grade, where installed below grade, or where exposed to moisture, shall have moisture- resistant type insulation. Lighting and receptacle branch circuit conductors shall be Type THHN/THWN.
- 2.2 Conductors No. 8 and larger shall be stranded. Minimum conductor size shall be No. 12 AWG unless otherwise indicated. Conductors terminating at vibrating or moving equipment shall be stranded, regardless of size.
- 2.3 Where taps and splices are necessary and approved, they shall be made in approved splice boxes, wireways, manholes, etc. with suitable connectors as recommended by wire and cable manufacturer.
- 2.4 Where conductors are to be connected to metallic surfaces, the coated surfaces of the metal shall be polished before installing the connector. Lacquer coating of conduits shall be removed where ground clamps are to be installed.
- 2.5 Wire and cable shall be factory color-coded by integral pigmentation, with a separate color for each conductor and neutral conductor. The color code indicated shall be used consistently throughout the Electrical System installation, unless specified to the contrary in another section of these Specifications for that system. Color coding for #8 and larger conductors may be by means of colored tape, applied in overlapping layers to each conductor at each outlet, cabinet, junction, or termination. Tape shall cover at least 6 inches of the conductor and shall not loosen or change color with age.
- 2.6 COLOR CODE
- A. Color code for lighting and power conductors shall be as per common practice.

- A. Signal, fire alarm, intercommunication, control system and any other such system wiring shall be appropriately color coded to facilitate checking and circuit identification.
  - B. Where isolated grounds are specified they shall be green with yellow tracers to prevent confusion with normal equipment grounds.
- 2.7 Wire and cable shall be manufactured by Southwire Company, Essex Group, American Insulated Wire or approved equal.

### **PART 3 - EXECUTION**

- 3.1 All conductors shall be installed in conduit unless otherwise noted. No conductors or cables shall be installed in conduits, ducts, or raceways until the raceway system has been completed. When installing conductors, the Electrical Contractor shall exercise due care to prevent damage to conductor or insulation. Only approved cable lubricants shall be used when necessary. All feeder cables including neutral and ground shall be continuous from origin to panel or equipment termination without running splices in intermediate pull or splice boxes. Unless otherwise noted, each conduit raceway shall contain only those conductors constituting a single feeder circuit or branch circuits as shown on the drawings. Do not combine "home-runs".
- 3.2 Minimum conductor size for power and lighting circuits shall be #12 awg. For circuits longer than 100 feet, conductor size shall be increased one size for each 75 feet or fraction thereof. When the conductor size has been increased for voltage drop, the conductor size may be dropped back down for the final connections to individual devices. These taps shall not exceed 20 feet in length.
- 3.3 The Electrical Contractor shall furnish and install all hangers, racks, cable cleats and supports required to make a neat and substantial cable installation.

**END OF SECTION**

**SECTION 26 05 26**  
**GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**

**PART 1 - GENERAL**

- 1.1 The entire Electrical System and Building Structure shall be grounded. The following items of equipment, appurtenances, and as required by Article 250 of the NEC, shall be grounded:
- A. Electric Service, Equipment and Enclosures.
  - B. Conduits and Raceways.
  - C. Neutral and Ground Conductors.
  - D. Switches, Breakers, Panels.
  - E. Motor Frames, Controller Cabinets, Lighting Fixtures, and building structure.
- 1.2 CODE AND STANDARD COMPLIANCE:
- A. NEC: Article 250.
  - B. UL: Standards 467 and 869.
  - C. IEEE: Standards 142 and 241.

**PART 2 - PRODUCTS**

- 2.1 All products shall comply with NEC, UL and IEEE as applicable.
- 2.2 All grounding conductors shall be copper.

**PART 3 - EXECUTION**

- 3.1 Bonding jumpers to maintain ground continuity at raceway and pull box expansion joints shall be stranded cable or copper braid sized in accordance with Article 250 of the NEC and installed with approved ground fittings.
- 3.2 Grounding jumpers shall be installed across all water meters. Jumpers shall be stranded bare copper cable or copper bus attached by means of exothermic welds to the water pipe.
- 3.3 Grounding Connectors: Use exothermic welds at all rods and terminations below grade; bolted pressure connectors shall be used above grade unless noted otherwise.
- 3.4 All connections and terminations below grade shall be left exposed until such time as they have been inspected and approved by the Architect-Engineer.
- 3.5 After grounding system has been completely installed, and before any equipment is placed in operation, the Electrical Contractor shall perform a test of the network. This

- shall be a three point fall of potential test. The resistance between ground and absolute earth shall not exceed 25.0 Ohms. Provide additional ground rods, as necessary until the resistance requirements are achieved.
- 3.6 All reinforcement steel in the building's concrete slabs shall be bonded to the building steel using #6 bare Cu ground wire and exothermic welds.
- 3.7 System grounding conductors shall be sized in accordance with NEC Table 250-66. Equipment grounding conductors shall be sized in accordance with NEC Table 250-122.
- 3.8 Provide separate green ground conductor in each feeder and each equipment branch circuit. The conduit system shall never be utilized as the sole equipment ground.
- 3.9 Provide separate green grounding conductor in each panelboard feeder.
- 3.10 Provide separate internal green grounding conductor in each flexible conduit used for motor connection.
- 3.11 Where isolated grounds are required, they shall be in accordance with the requirements of NEC.

**END OF SECTION**

**SECTION 26 05 33  
RACEWAYS FOR ELECTRICAL SYSTEMS**

**PART 1 - GENERAL**

- 1.1 Minimum size conduit shall be 3/4". Other sizes shall be as indicated on the plans, or as required by the NEC for number and size of conductors installed.
- 1.2 All conduit shall be of standard sizes and each length shall bear Underwriters Laboratories Label and manufacturer's trade mark.

**PART 2 - PRODUCTS**

- 2.1 Rigid steel conduit shall be National Electric Products Company, or approved equal; galvanized mild steel, specially selected with reference to uniformity of thickness and freedom from defects. Fittings shall be zinc-coated, threaded type.
- 2.2 Electrical metallic tubing raceways, where permitted, shall be U.L. Listed and as manufactured by Jones & Laughlin Conduit Products or approved equal.
- 2.3 Rigid Polyvinyl Chloride Conduit (PVC) shall be Type 40, heavy wall or Type 80 extra heavy wall as manufactured by Carlon Products or approved equal.
- 2.4 Flexible steel conduit shall be used to connect all motors and other moving electrical equipment. Liquid-tight flexible steel conduit, type U.A. as manufactured by Anaconda or approved equal, shall be used in damp locations where flexible conduit is required.

**PART 3 - EXECUTION**

- 3.1 Conduit run in finished areas of building shall be concealed in floor, wall, ceiling, above or behind furring, or as noted on the drawings. Contractor shall avail himself of Architectural and Structural drawings for information relating to slab thickness, reinforcing, finish lines, chases, furrings, ceiling construction and finishes, and shall be guided accordingly in installation of his work. In unfinished areas, conduit is to be run concealed where construction permits; otherwise, it may be run exposed. Exercise particular care in routing and grouping exposed conduit to present neat and workmanlike appearance with all lines running parallel with or perpendicular to building lines, giving due attention to ducts, pipe and other interferences. Exercise extreme care in laying out electrical work to ensure that ceiling outlets are located symmetrically within areas and with respect to air conditioning, heating and ventilating outlets, tile patterns, finishes, etc. Any errors shall be corrected at no additional cost to the Owner.
- 3.2 All field bends shall be made with standard tools and equipment manufactured especially for this purpose. Field-cut threads shall be protected with zinc-rich paint prior to installation.

- 3.3 Where embedded conduits cross building expansion joints, the Contractor shall furnish and install an offset expansion joint or a sliding expansion joint. Sliding expansion joints shall be provided with bonding strap and clamp. Where conduits are exposed, provide expansion fittings or flexible conduit as required.
- 3.4 Flexible conduit shall be used for connection on all motor terminal boxes to conduit stubs or outlets.
- 3.5 Flexible conduit shall be used for connection of control equipment requiring piping, such as solenoid valves, pressure controls, etc.
- 3.6 Where lighting fixtures require flexible conduit connections to junction boxes, use "greenfield," maximum length shall be 6 feet. Provide conduit supports to maintain a neat installation with no conduit supported by or resting on the ceiling system.
- 3.7 Where conduits are run individually, they shall be supported by straps or by using 1/4" galvanized rods or No. 8 galvanized wire with clips equal to Caddy "Kon Clips". The hangers shall be secured by means of toggle bolts on hollow masonry; expansion shields and machine screws or standard preset inserts on concrete or solid masonry; machine screws or bolts on metal surfaces; and wood screws on wood construction. The use of perforated strap or steel tie-wire will not be permitted. One hole strap may be utilized on conduits sized 1-inch and smaller. Two hole straps shall be used on larger conduits.
- 3.8 Where multiple conduits are run horizontally at the same elevation and grade, they may be supported on trapezes or channels suspended on rods. Trapeze members, including suspension rods, shall be properly sized for number, size and loaded weight of conduits to be supported.
- 3.9 Lay out and install conduit runs to avoid proximity to hot water piping. In no case run conduit within 3" of such piping.
- 3.10 Conduits entering panelboards, pull boxes, support boxes or outlet boxes shall be secured in place by galvanized steel lock-nuts and bushing.
- 3.11 Conduit joints shall be made tight with approved couplings; turns and offsets made with long sweep ells or bends. Ends of conduit are to be cut square, reamed and brought butt-to-butt in couplings.
- 3.12 Bends in conduit shall be made with an approved bending device and conduit bends or off-sets in which conduit is crushed, deformed or otherwise injured is not to be installed. Field bends and offsets shall be uniform and symmetrical. Install factory elbows on 2" and above conduit.
- 3.13 Conduit not embedded in concrete, all vertical risers, etc. shall be firmly secured by means of approved pipe clamps, hangers, etc. Run conduit without sags and pockets and in general drain or pitch toward boxes. Where conduit crosses building expansion joints, provide expansion fittings and approved ground jumper.

- 3.14 Where conduits are supported under exposed steel beams or bar joists, approved type beam clamps and/or clamp/hangers shall be used.
- 3.15 Conduit system(s) shall be electrically and mechanically continuous. Conduit system shall be bonded throughout.
- 3.16 All hangers shall be so located as to properly grade and support horizontal conduits without appreciable sagging of these lines. (See Articles 346 and 348, NEC). All conduit shall be of standard size and each length shall bear Underwriters Laboratories Label and manufacturer's trademark.
- 3.17 Where lines of different Contractors are racked on same supporting structures, each Contractor shall cooperate with the other trades involved to properly locate supporting members, and shall furnish a proportionate share of labor and materials involved in same installation; also shall cooperate with other trades so that the same type hanger is used throughout.
- 3.18 Conduit shall be kept corked and dry during construction and shall be swabbed out before wires are pulled into conduit.
- 3.19 Rigid PVC may be used for the following applications:
- A. Outdoors and underground for:
    - 1. Electrical Primary Service
    - 2. Electrical Secondary Service
    - 3. Telephone Service Entrance
    - 4. Electrical Branch Circuits
  - B. Under Slab on Grade: PVC conduits may be run under, but not embedded in, slab on grade. Each conduit shall transition to rigid steel ells before turning vertically up through grade or slab. Exposed PVC conduit emerging from floors or will not be permitted.
  - C. All joints shall be made watertight using fittings and other materials as recommended by the conduit manufacturer.
- 3.20 Empty Conduit Systems
- A. Where empty conduit systems are indicated, provide all raceways, junction boxes, outlet boxes, and appurtenant devices as indicated or as required for a complete system.
  - A. Identify raceways above furred ceilings and in unfinished spaces every 20 feet.
  - B. In each "empty" conduit, provide a 9-gauge galvanized pull wire. Leave 12 inches slack wire at each end.

- C. All empty conduit shall be covered at each end to prevent the entry of dirt and debris.
- 3.21 Conduits below grade shall be installed a minimum of 24 inches below finished grade.
- 3.22 EMT shall be used for all interior feeder & branch circuits except where noted otherwise.
- 3.23 Rigid steel conduit shall be used for all exposed exterior applications and installations subject to physical damage. Turn-ups shall be made with GRS elbows.

**END OF SECTION**



**SECTION 26 05 34  
PULL BOXES & JUNCTION BOXES**

**PART 1 - GENERAL**

- 1.1 Furnish and install pull boxes where necessary in the raceway system to facilitate conductor installation.
- 1.2 Where indicated on the plans and where necessary to terminate, tap-off or redirect multiple conduit runs, the Electrical Contractor shall furnish and install appropriately designed junction boxes.
- 1.3 All boxes shall be made of galvanized steel, or as specified, of metal gage and physical size as required by the NEC for the number and size of conduits and conductors involved. Boxes shall have removable screw covers for flush or surface installation as indicated on the plans. Boxes shall be securely mounted to the building structure with supporting facilities independent of the conduits entering or leaving the boxes.

**PART 2 - PRODUCTS**

- 2.1 Pull boxes and junction boxes shall be manufactured by Steelcity, Appleton, Raco or approved equal.

**PART 3 - EXECUTION**

- 3.1 In general, conduit runs of more than 100'-0", or with more than 3 right-angle bends, shall have a pull box installed at a convenient intermediate location.

**END OF SECTION**

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**SECTION 26 05 35  
OUTLET BOXES**

**PART 1 - GENERAL**

- 1.1 All outlet boxes shall be standard galvanized steel type, at least 1-1/2" deep, single or gang style type of size to accommodate devices noted. Outlet boxes shall be equipped with plaster ring or cover as necessary.
- 1.2 The Electrical Contractor shall study all plans relative to the spaces surrounding each outlet in order that his work may fit the work of Others; and, that when fixture outlets or controls are installed, they will be symmetrically located and best-suited for each condition. Outlet boxes located in the concrete, damp places or exposed to the weather shall be of the cast-metal type having threaded hubs. Each outlet box shall have sufficient volume to accommodate the number of conductors entering the box in accordance with the requirements of the National Electrical Code. Outlet boxes shall be not less than 1-1/2" deep, unless shallower boxes are required by structural conditions and are specifically approved by the Architect-Engineer. Ceiling and bracket outlet boxes shall not be less than 4" octagonal except that smaller boxes may be used where required by the particular fixture to be installed. All ceiling and bracket outlets, where required, shall be equipped with a 3/8" fixture stud, installed through the back of the box and not dependent on its mounting bolts for its support. The fixture stud shall be securely fastened to the box to prevent turning. Boxes shall be rigidly supported from a structural member of the building, either directly or by using a metal or wood brace per Article 370 of the NEC.
- 1.3 Switch and receptacle boxes shall be approximately 2" x 3".
- 1.4 Switch boxes shall be 1, 2, 3, etc. gangs as required. Sectional switch boxes shall not be used. Outlet boxes for special equipment such as electrical thermostat controls and signal circuits, clocks, etc. shall be suitable for the equipment and service intended, but shall be not less than 4" square and 2" deep. Suitable covers designed for the equipment served shall be provided.

**PART 2 - PRODUCTS**

- 2.1 Outlet boxes for telephone and signaling systems shall be of the utility type.
- 2.2 Concealed or flush mounted outlet boxes shall be zinc-coated or cadmium plated sheet steel suitable for the conditions of each outlet; "Raco" or approved equal.
- 2.3 Boxes located outdoors shall be cast type, as manufactured by Appleton, Crouse-Hinds, or approved equal.
- 2.4 Outlet boxes shall be manufactured by Steelcity, Appleton, Raco or approved equal.

**PART 3 - EXECUTION**

- 3.1 Boxes installed in concealed locations shall be set flush with the finish surfaces and shall be provided with the proper type extension rings or plaster covers where required. Outlets in plaster walls shall be equipped with plaster rings except as otherwise noted or specified. Boxes shall be installed in a rigid and satisfactory manner and shall be fastened directly with wood screws on wood; bolts and expansion shields on concrete or brick; toggle bolts on hollow masonry units; and, machine screws or welded threaded studs on steel work.
- 3.2 Device plates as specified, or noted elsewhere, shall be provided for each outlet to suit the device installed. Plates shall be installed with all 4 edges in continuous contact with finished wall surfaces without the use of mats or similar devices. Plates shall be installed vertically with an alignment tolerance of 1/16". The use of sectional device plates will not be permitted.
- 3.3 Wall switch outlets shall be 48" above finished floor unless otherwise indicated. When located near doors, they shall be installed on the lock side of the door; unless otherwise noted.
- 3.4 Clock outlet boxes shall be installed 7'-6" above the finished floor unless otherwise indicated, or a height to meet Architectural conditions.
- 3.5 Telephone and convenience receptacle wall outlet boxes shall be set flush 18" above finished floor unless otherwise noted.
- 3.6 Outlet boxes shall be installed at the approximate locations shown on the drawings, or within 2'-0" of the location as directed by the Architect-Engineer.
- 3.7 Box heights may be adjusted, if required, to coordinate with exposed block or brick coursing.
- 3.8 Outlet boxes for devices located on opposite sides of one-hour and two-hour walls shall be separated by a minimum horizontal distance of 24 inches.
- 3.9 Where outlet boxes are flush-mounted in rated walls, clearance between wallboard facing and box shall not exceed 1/8", per U.L. requirements.

**END OF SECTION**

**SECTION 26 05 53  
IDENTIFICATION FOR ELECTRICAL EQUIPMENT**

**PART 1 - GENERAL**

1.1 NAMEPLATES

- A. The following items shall be equipped with nameplates:
1. All motor starters, motor control centers, pushbutton stations, control panels, time switches.
  2. Disconnect switches, fused and unfused, switchboards and panelboards, circuit breakers, contactors or relays in separate enclosures.
  3. Special electrical systems shall be properly identified at junction and pull boxes, terminal cabinets and equipment racks.
  4. Emergency power system components, enclosures, boxes and panelboards.
- B. INSCRIPTION
1. Nameplates shall adequately describe the function or use of the particular equipment involved. Where nameplates are detailed on the drawings, inscription and size of letters shall be as shown. Nameplates for panelboards and switchboards shall include the panel designation, voltage and phase of the supply.
  2. For example, "Panel A, 120/208 v, 3-phase, 4 wire". The name of the machine on the motor nameplates for a particular machine shall be the same as the one used on all motor starters, disconnects and PB station nameplates for that machine.

**PART 2 - PRODUCTS**

2.1 NAMEPLATES

- A. Nameplates shall be laminated Phenolic plastic, BLACK front-and-back with WHITE core, with lettering etched through the outer covering.
- B. Nameplates for emergency power system identification shall be as above, except shall be RED in color.

**PART 3 - EXECUTION**

3.1 IDENTIFICATION

- A. At all locations, lettering shall be 1/4" high, unless otherwise indicated on the drawings. Nameplates shall be securely fastened to the equipment with No. 4 Phillips', round-head, cadmium plated, steel self-tapping screws. Adhesives will not be accepted.
  - B. Warning Signs shall be furnished and installed in accordance with the following:
    - 1. On nonload break disconnects and cutouts, the signs shall read, "DO NOT OPEN UNDER LOAD". Letters shall be 1" high, minimum.
    - 2. Warning signs shall be of standard manufacture, fabricated of No. 18 gage steel, or heavier, with a porcelain enamel finish. Letters shall be RED on WHITE background.
- 3.2 Junction box covers shall be identified in accordance with system served, eg. "FA" for Fire Alarm, "IC" for Intercom, etc. In addition, all junction boxes for fire alarm system shall be painted RED. For junction boxes only, identification may be provided utilizing indelible markers, provided marking is neat and legible.

**END OF SECTION**

**SECTION 26 24 14  
PANELBOARDS**

**PART 1 - GENERAL**

- 1.1 Panelboards shall be of the dead-front safety type equipped with circuit breakers and shall be of the type shown on the drawings. Panelboards shall be equipped with the type, size and number of branch circuit breakers arranged and numbered as shown on the drawings. Where main circuit breaker is shown, it shall be of the type and size indicated. Panelboards shall be enclosed in code-gage steel cabinet complete with door, door cylinder lock, circuit identification, directory holder, neutral bar, ground bus and lugs for all cable connections. All locks shall be keyed alike. Where "SPACE" is indicated, mounting hardware shall be provided and space shall be bussed for future breakers. Panel fronts shall be provided with removable 1-pole fillers in spaces. Branch connectors, mounting brackets and other hardware shall be provided for future breakers as indicated on the drawings. Circuit-breaker units shall be mounted on channel iron or formed-steel mounting backs, drilled and tapped so that units of same frame size and number of poles may be interchanged and removed from the front without disturbing the adjacent units. Panels shall be bussed according to the requirements shown on the drawings, and shall have lugs equipped with approved connectors for the size of conductor feeding the panel. Double lugs shall be provided for handling double feeder conductors. All lugs shall be solderless type. Each circuit shall be permanently numbered. Each panel shall have a typewritten directory mounted under a transparent protective cover, set in a metal frame on the inside of the cabinet door.
- 1.2 All panelboards shall be suitably rated for the available fault currents on this project.
- 1.3 Panelboards shall be listed for use as service entrance equipment, where required.
- 1.4 Provide HACR breakers where indicated or where required by the NEC or the manufacturer of the equipment served.

**PART 2 - PRODUCTS**

- 2.1 All panelboards shall have name plates as described in SECTION 16195.
- 2.2 All bus bars, including ground bar, shall be tinned copper, 98% conductivity.
- 2.3 All panelboards shall be standard units as manufactured by Square "D" Company. Equal units as manufactured by Siemens, GE or Cutler Hammer will be considered.

**PART 3 - EXECUTION**

- 3.1 The panelboard directory shall contain the following information:
- A. Panel designation and voltage.

- B. Distribution panel from which it is fed.
  - C. For each circuit breaker, complete information concerning the outlet controlled, including the room number or area designated on the plans.
- 3.2 Panelboards shall be installed with top device 5'-6" above finished floor unless otherwise indicated.
- 3.3 Where ceiling space exists, recessed panelboards shall have spare conduits stubbed above ceiling. Install one 3/4" conduit for each 2 spare breakers and/or blank spaces.
- 3.4 Panelboard nameplates shall be mounted on exterior trim so as to remain visible with panelboard door closed.

**END OF SECTION**



**SECTION 26 27 26  
WIRING DEVICES**

**PART 1 - GENERAL**

- 1.1 Unless otherwise specified elsewhere or shown on the drawings, all switches shall be quiet type, rated 120-277 v AC as specified. Lock-type switches shall be of comparable grade, complete with 1 key for each switch. Switches shall be loaded to not more than 80% of their rating.
- 1.2 Where shown near doors, wall switches shall be mounted not less than 2" and not more than 12" from trim. Switches shall be installed near "strike" side of door.
- 1.3 Unless otherwise specified or indicated, all standard duplex receptacles shall be 20 ampere, 120-volt and shall be installed with ground pole at top.

**PART 2 - PRODUCTS**

2.1 DEVICES:

- A. Wiring devices shall be specification grade as manufactured by Hubbell, Arrow-Hart, or Leviton. Device color shall be chosen by Architect
- B. Wall switches shall be equal to the following:

<u>TYPE</u>	<u>HUBBELL NO.</u>
SPST (Single Pole)	CS-1221
DPST (Double Pole)	CS-1222
SPDT (Three-Way)	CS-1223
DPDT (Four-Way)	CS-1224

- C. Unless otherwise indicated, receptacles shall be equal to:

<u>TYPE</u>	<u>HUBBELL NO.</u>
Single, 20 Amp	CR-5361
Duplex, 20 Amp	CR-5362
Duplex GFCI, 20 Amp	CR-GF-5362
Duplex ISOL. GND., 20 Amp	CR-IG-5362

2.2 PLATES:

- A. Device plates for flush mounted devices shall be single gang or multi-gang as required to fit the boxes and devices at each location.
- B. Device plates for outdoor receptacles shall be equal to those manufactured by TAYMAC or CARLON and shall be in compliance with NEC 410-57(b) for wet locations.

**PART 3 - EXECUTION**

- 3.1 Device plates shall be installed plumb, with all edges in continuous contact with the wall surface.
- 3.2 Receptacles installed outdoors shall be GFCI type in 4" square flush mounted box.
- 3.3 Outlets which must be surface mounted outdoors shall be mounted in cast boxes.
- 3.4 Outlets which must be surface mounted indoors shall be installed in cast boxes with coverplates appropriate for the box and the device.
- 3.5 Mounting heights of all devices shall be in accordance with ADA requirements.

**END OF SECTION**

**SECTION 26 27 28  
DISCONNECT SWITCHES**

**PART 1 - GENERAL**

- 1.1 Disconnect switches shall be fusible or nonfusible as indicated on the plans. Switches shall be fusible whenever required by manufacturer of equipment served.
- 1.2 All disconnect switches shall be heavy-duty type, quick-make, quick-break or as shown on the plans. Disconnect switches for motor circuits shall be horsepower-rated.
- 1.3 Disconnect switches shall have a cover interlock, with defeat device, to prevent unauthorized personnel from opening the door when the switch is on.

**PART 2 - PRODUCTS**

- 2.1 All disconnect switches shall have switch blades which are fully visible in the "OFF" position when the door is open. Disconnect switches shall be of dead-front construction with permanently attached arc suppressors hinged or otherwise attached to permit easy access to line-side lugs without removal of the arc suppressor. Lugs shall be UL listed for copper and/or aluminum cables and front removable. All current-carrying parts shall be plated by electrolytic processes.
- 2.2 Disconnect switches shall be furnished in NEMA 1 general purpose enclosures except NEMA 3 or 3R (Raintight) shall be used in damp locations.
- 2.3 Enclosures shall be of code gage (UL 98) sheet steel or code gage (UL 98) galvanized steel. They shall be treated with a rust-inhibiting phosphate and finished in Gray baked enamel. Disconnect switches shall be horsepower-rated for 250 Volts AC or DC, or 600 Volts AC as required.
- 2.4 Fusible disconnect switches shall be equipped with a device to reject all nonclass "R" fuses. Switches shall withstand up to 200,000 amps RMS symmetrical.
- 2.5 All disconnect switches shall be identified with engraved laminated plastic labels as described in Section 260553.
- 2.6 All disconnect switches shall be Square "D". Equal units as manufactured by G.E., Cutler Hammer, or Siemens will be considered.

**END OF SECTION**

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**SECTION 26 28 13  
FUSES AND CIRCUIT BREAKERS**

**PART 1 - GENERAL**

- 1.1 Fuses shall not be shipped installed in switches in electrical equipment, nor shall they be shipped to the job site, until the equipment is ready to be energized.
- 1.2 Standard dimension fuses 600 amps or less (Class RK-1) shall be installed in all switches unless otherwise noted.
- 1.3 Motor protection dual-element fuses installed in individual circuits shall be sized at 125% of motor nameplate current rating or the next standard fuse size. (or as recommended by equipment manufacturer)
- 1.4 This Specification covers molded case circuit breakers rated 15 through 1,000 amperes, 120 V AC, 240 V AC, 277 V AC, and 480 V AC. Breakers covered under this Specification may be installed in switchboards, panelboards, motor control centers, combination motor starters, busway plugs and individual enclosures. Circuit breakers shall be as indicated on the drawings and shall have trip ratings as shown.
- 1.5 Molded case circuit breakers shall be quick-make and quick-break thermal-magnetic type. They shall have wiping type contacts. Each shall be provided with arc chutes, individual trip mechanisms on each pole. 2- and 3-pole breakers shall be integral common trip. All breakers shall be calibrated for operation in an ambient temperature of 40°C.
- 1.6 Molded case circuit breakers shall be trip-free. Each breaker shall have trip indication independent of the "ON" or "OFF" positions.
- 1.7 Breakers shall be capable of being mounted in enclosures without the use of base insulators between the breaker and the enclosure.
- 1.8 Branch circuit breakers feeding convenience outlets shall have sensitive instantaneous trip settings of not more than 10 times the trip rating of the breaker in order to give "flash protection" for frayed stranded wire cords. Circuit breakers serving HVAC equipment shall be HACR type, where applicable. Breakers used or intended for switching duty shall carry "SWD" label.

**PART 2 - PRODUCTS**

- 2.1 All fuses shall be of the same manufacture to retain selectivity as designed.
- 2.2 All fuses shall be current limiting with 200,000 amperes interrupting capacity as manufactured by BUSSMANN (Cooper Industries), or equal as manufactured by GOULD SHAWMUT.
- 2.3 Class RK-1 Fuses shall be BUSSMANN Low-peak Dual-element, Time Delay fuses LPN (LPS) or equal as manufactured by GOULD SHAWMUT.

- 2.4 All molded case circuit breakers shall be UL listed and meet NEMA Standards Publication No. ABI-1964. All devices shall meet Federal Specification No. W-C-375A.

**PART 3 - EXECUTION**

- 3.1 20% spare fuses or a minimum of 3 of each size and type shall be delivered to the Owner at the completion of the Project.
- 3.2 A fuse identification label, showing type and size, shall be placed inside the door of each switch.

**END OF SECTION**

**SECTION 26 51 13  
LIGHTING FIXTURES**

**PART 1 - GENERAL**

- 1.1 The Electrical Contractor shall furnish all luminaires, lighting equipment and components shown on the plans, listed in the Fixture Schedule and specified herein. He shall furnish all labor and materials to install specified equipment in the manner indicated.
- 1.2 All luminaires and lighting equipment shall be delivered to the project site complete with suspension accessories, canopies, hickeyes, casings, sockets, holders, reflectors, ballasts, diffusing material, louvers, plaster frames, recessing boxes, etc., all wired and assembled as indicated.
- 1.3 The Electrical Contractor shall furnish and install accessories and accessory wiring as specified herein.

**PART 2 - PRODUCTS**

- 2.1 Fixtures shall be UL or ETL listed.
- 2.2 Fixture submittals shall include estimated useful life calculated based on IES LM-70. Minimum value shall be 50,000 hours.
- 2.3 Fixture submittals shall include rated efficacy (LM/W) values for the color temperature, lumen output and distribution type specified.
- 2.4 Electronic files of photometric data in IESNA LM-63 format shall be available upon request for all fixtures at the color temperature, lumen output and distribution type specified.
- 2.5 All fixtures shall include integral surge protection equal to or exceeding the specified fixtures.
- 2.6 All fixtures shall have a five year warranty. This shall include drivers, arrays and internal controls.
- 2.7 All recessed fixtures shall be 100 percent serviceable from below.
- 2.8 Provide a sample of each fixture proposed for substitution upon request.
- 2.9 Only fixtures manufactured by a company specializing in manufacturing the product with a minimum of five years documented experience will be considered.
- 2.10 Acceptable manufacturers are Acuity, Hubbell or Eaton.
- 2.11 Alternate fixtures to those specified must be submitted to the Architect/Engineer a minimum of 10 days prior to bid for approval.

- 2.12 Alternate fixtures will be evaluated based on appearance, LM/W, distribution, performance, construction quality and manufacturer's record.

### **PART 3 - EXECUTION**

- 3.1 This Contractor shall take special note of the voltage at which fixtures are to be operated.
- 3.2 It shall be the responsibility of the Contractor to assure his count by type as well as voltage prior to ordering. Extras will not be allowed for any errors by this Contractor.
- 3.3 All fixtures shall be square and level in relation to surrounding materials and space.
- 3.4 This contractor shall coordinate with the ceiling contractor before ordering fixtures to ensure that the fixtures ordered have the proper mounting features to be compatible with the ceiling types.
- 3.5 All fixtures shall be protected from general construction and shall be thoroughly cleaned prior to final inspection.

**END OF SECTION**



**SECTION 28 10 00  
ACCESS CONTROL**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. Access control system requirements.
- B. Access control units and software.
- C. Access control point peripherals, including readers.
- D. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 7100 - Door Hardware: Electrically operated door hardware for interface with the access control system.
- B. Section 28 3100 - Fire Detection and Alarm: For interface with the access control system. Doors to be released upon activation of the fire alarm system.

**1.03 DESCRIPTION**

- A. Provide an electronic Access Control System (ACS) for (project name)
  - 1. .
- B. Furnishing and installing an electronic door access control system and integrated, fully compatible property management system.
  - 1. The system and all software shall be completely installed and left fully operational for the Owner's use.
  - 2. years shall be included in the proposal. A minimum of four (4) admin login credentials shall be included with the system.

**1.04 REFERENCES**

- A. ANSI/BHMA A156.13 - Locks and Latches, Mortise (Grade 1).
- B. ANSI/BHMA A156.25 – Electrified Locks (Grade1).
- C. UL 10C and ULC S-104, on the fire-rated door up to and including three (3) hours.
- D. FCC part 15 Class A and CE directive 89/336/EEC.
- E. ADA compliant
- F. RoHS (Restriction of Hazardous Substances) and Shabbat compliant
- G. UL 294 - Access Control System Units: Current Edition, Including All Revisions.

**1.05 SUBMITTALS**

- A. Product Data: Manufacturer's product data sheets including installation details, material description's dimensions of individual components and profiles, operational descriptions, and finishes.
- B. Shop Drawings: Details of electrified integrated locking hardware and access control firmware, indicating the following:
  - 1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware and firmware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
    - a. Basic Riser/Elevation diagram(s) of each unique access controlled opening showing location and interconnection of major system components with respect to their

- placement in the respective door openings.
- b. Riser and point-to-point block wiring diagrams.
- C. Factory Certification: Provide a copy of the manufacturer(s) official certification or accreditation document indicating proof of status as a qualified and authorized provider of the primary access control components from either one of the systems below or approved equal.
- D. Operating and Maintenance Manuals: Provide three (3) bound copies of manufacturers operating and maintenance manuals for each item comprising the complete access control and site management installation at closeout.
- E. E As-Built Drawings: During system installation, the Contractor is to maintain a separate hard copy set of drawings, elevation diagrams, and wiring diagrams of the access control system to be used for record drawings. This set is to be kept accurately recorded and up-to-date by the contractor for a minimum of three (3) months from the date the system is turned over to the owner including all changes and additions to the access control system.

#### **1.06 WARRANTY**

- A. ACS Software and Field Hardware Warranty
  - 1. ACS Software shall be warranted for a period of two (2) years from the date of shipment from the manufacturer, to be free of defects, and will function in substantial accordance with the published specification.
  - 2. ACS Field Hardware shall be warranted for a period of two (2) years from the date of shipment from the manufacturer, will be free from defects, and will function in general accordance with the product specifications.
- B. Contractor Installation Warranty
  - 1. The contractor shall warrant all equipment not covered above for a period of two (2) years from the date of beneficial use.

#### **1.07 ACS STARTUP AND COMMISSIONING**

- A. The ACS contractor shall, at a minimum, provide programming and testing of the system to include:
  - 1. Programming for all readers for complete secured door operation
  - 2. Programming for all monitored and controlled security points and zones
  - 3. Programming of all Time Zones and schedules
  - 4. Programming of Access Levels
  - 5. Database backup scheduling to offsite cloud service
  - 6. All other programming to ensure a completely functional system

#### **1.08 MAINTENANCE SERVICES**

- A. Software: The Contractor shall provide all software updates during the period of the warranty and verify operation in the system. These updates shall be accomplished in a timely manner, fully coordinated with ACS operators, shall include training for the new changes/features enabled, and shall be incorporated into soft copies of the operations and maintenance manuals, and software documentation.

#### **1.09 QUALITY ASSURANCE**

- A. Comply with the following:
  - 1. NFPA 70
  - 2. The requirements of the local authorities having jurisdiction
  - 3. Applicable TIA/EIA standards
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with a minimum of three (3) years of documented experience.

- C. Installer Qualifications: Company specializing in performing the work of this section with a minimum of three (3) years documented experience with access control systems of similar size, type, and complexity, and providing contract maintenance service as a regular part of their business; authorized manufacturer's representative.

#### **1.10 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.
- B. Store products in the manufacturer's unopened packaging, keep dry, and protect from damage until ready for installation.

#### **1.11 FIELD CONDITIONS**

- A. Maintain field conditions within the manufacturer's required service conditions during and after installation.

### **PART 2 - PRODUCTS**

#### **2.01 MANUFACTURER**

- A. Access Control System
- B. Basis of Design:
1. ProdataKey 67 W. 13490 S.
  2. Draper, Utah 84020
  3. Phone: 801.317.8802
  4. Toll-Free Phone: 800.218.0283 Website: [www.prodatakey.com](http://www.prodatakey.com)
- C. Substitutions: Equivalent systems are allowed to be presented to the Architect/Engineer in advance for approval prior to the bid date. Systems that can meet the level of performance outlined in this specification shall be considered acceptable for bidding.

#### **2.02 ACCESS CONTROL SYSTEM REQUIREMENTS**

- A. Provide a new access control system consisting of all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.
- B. Access Control Points:
1. Refer to Architectural Door Hardware Specification Section 08 71 00 for the door hardware listing for each door within the building, including the type of egress hardware used and a description of the operation of the door.
  2. Refer to the Architectural Door Schedule for a complete list of doors on the project and those with specific hardware requirements for control.
  3. See Electrical Drawings for specific components:
    - a. Peripherals on Secure Side:
      - 1) Reader/Keypad: Proximity Reader
    - b. Locking Device: Electric strike or magnetic lock, provided by others to be coordinated with Door Hardware Consultant.
      - 1) Configuration: Fail-safe, as noted within Door Hardware Specifications.
    - c. Interface Requirements:
      - 1) Provide interface with the fire alarm system to release door lock upon activation of the fire alarm system.
- C. Interface with Other Systems:
1. Provide products compatible with other systems requiring interface with the access control system.
  2. Interface with electrically operated door hardware as specified in Section 08 71 00.

- a. Capable of locking/unlocking/releasing controlled doors
- b. Capable of receiving input from integral door hardware switches
- 3. Interface with the fire alarm system as specified in Section 28 31 00
- D. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to the authority having jurisdiction as suitable for the purpose indicated.
  - 1. Access Control Units and Readers: Listed and labeled as complying with UL 294

### **2.03 ACCESS CONTROL UNITS AND SOFTWARE**

- A. Provide access control units and associated software compatible with readers to be connected.
  - 1. System to be able to control the necessary quantity of doors through the interconnection of Eight io and Single io door controller cabinets. Connections can be made through wireless or network communications.
  - 2. Wireless-based controllers shall be provided using WiMAC (Wireless Mesh Access Control) technology with up to 1,000 devices per site.
  - 3. Network-based controllers shall be provided through network communications using Category 6 cabling from device to device as needed.
  - 4. The system is to provide unlimited cardholders along with event storage, battery back-up, and automatic offsite data backup of not less than 180 days.
  - 5. The system is to allow for complete configuration and management through pdk.io SaaS-based management service via two-factor authentication using Internet- connected mobile devices and other compatible Internet-connected web browsers.
- B. Computers
  - 1. Workstation Computers: Unless otherwise indicated, workstation computer hardware and associated peripherals not furnished by the access control system manufacturer to be provided by others, meeting access control system equipment manufacturer's recommended requirements.
- C. Badging Peripherals: Unless otherwise indicated, badging peripherals not furnished by the access control system manufacturer to be provided by others.
- D. Software
  - 1. Unless otherwise indicated, provide all software and licenses required for a fully operational system.
  - 2. Pdk.io cloud software for Cloud Node configuration, management, and control. Minimum functionality is to include but is not limited to:
    - a. 180-day cloud backup
    - b. Real-time software updates
    - c. Custom reporting
    - d. Wireless mobile site surveys
    - e. Email and text supervision and alerting
    - f. True site partitioning
    - g. Custom rules engine
    - h. Elevator control

### **2.04 CLOUD NODE (MAIN PANEL) – PART NUMBER: CN**

- A. The intelligent Cloud Node is the main panel and gateway of the access system and a
  - 1. cost-effective building block platform that allows expansion in a scalable manner. Up to 1000 doors can be controlled from one (1) Cloud Node for an efficient space-saving package.
- B. The Cloud Node is strategically placed at the customer location and connected to the door controllers with WiMAC wireless or Network (Ethernet). Each Cloud Node operates as a fully

intelligent system that retains all data necessary for operation. With its integral real-time functionality for inputs, outputs, cards, and schedules, all reporting and data changes are instant. Remote login to the Cloud Node via pdk.io allows for off-site configuration, management, and superior dealer and customer support.

C. Cloud Node Specifications

1. Connections: WiMAC Wireless, Ethernet, Power
2. Com-Modules: WiMAC Wireless and Network (Ethernet)
3. Processor: Quad Core
4. Memory: 1GB RAM
5. Storage: 16 GB solid-state - Store virtually unlimited cardholders, rules, and events. All data and configuration auto-backup twice per week.
6. Connectivity: pdk.io for remote connection for Dealer and Customer support
7. Encryption: 128-bit AES

D. Cloud Node Single io Door Controller Specifications:

1. Connections: Power Input, Normally Open, Normally Closed, Common, Two Reader Ports (With LED control), Request To Exit, Door Position Sensor, Aux Out (Relay with N/O or N/C that can be tied to positive or ground)
2. Com-Modules: WiMAC Wireless and Network (Ethernet)
3. Connectors: Removable PCB terminals with screw-down wire crimps
4. Relays: 2 x Industrial grade Form C relays (1-Port 1, 1-AUX)
5. Onboard Memory: Store up to 10 E-Cards
6. 5 amp-hour backup battery (purchased separately)

**2.05 EIGHT IO DOOR CONTROLLER – PART NUMBER: 8DW (WIRELESS) / 8DE (ETHERNET)**

- A. Use the Eight io door controller for eight individual doors or ten elevator floors. Add the Eight Door Expansion kit to control sixteen doors or 20 elevator floors out of one 12x12 security cabinet.
- B. Specifications
1. Connections: Power Input, Normally Open, Normally Closed, Common, Reader Port, Request To Exit, and Door Position Sensor for 8 individual ports. 2 x auxiliary PCB terminals to control 2 x Aux relays.
  2. Com-Modules: WiMAC Wireless and Network (Ethernet)
  3. Connectors: Removable PCB terminals with screw-down wire crimps
  4. Relays: 10 Industrial grade form C relays (8 Door / 2 Aux)
  5. Onboard Memory: Store up to 10 E-Cards

**2.06 SINGLE IO DOOR CONTROLLER – PART NUMBER: 1DW (WIRELESS) / 1DE (ETHERNET) / 1DPOE (POE)**

- A. The Single io door controller will control a single door with all the expected connections for Reader (In/Out), DPS, REX, and more. Includes a 12 VDC to 24 VDC 1.5 Amp charging Power Supply with low voltage input options.
- B. Specifications
1. Connections: Power Input, Normally Open, Normally Closed, Common, Two Reader Ports (With LED control), Request To Exit, Door Position Sensor, Aux Out (Relay with N/O or N/C that can be tied to positive or ground).
  2. Com-Modules: WiMAC Wireless Network (Ethernet)
  3. Connectors: Removable PCB terminals with screw-down wire crimps
  4. Relays: 2 x Industrial grade Form C relays (1-Port 1, 1-AUX)
  5. Onboard Memory: Store up to 10 E-Cards

6. amp-hour backup battery (purchased separately)

### **2.07 PRO WIRELESS ETHERNET GATEWAY – PART NUMBER: LZE**

- A. The Pro Wireless Ethernet Gateway allows you to bridge WiMAC wireless controllers to a local network shared with the Cloud Node.
- B. Specifications
1. Connections: Power Input, Ethernet Port
  2. Encryption: 128-bit AES
  3. Power: 9 VDC to 30 VDC

### **2.08 CARD READERS – PART NUMBER: RDRM, RDRG, RDRKP, RDRMR, RDRGR, RDRSR**

- A. Wiegand Output Proximity Readers. 125 kHz EM and 125 kHz HID formats are compatible with these readers. These readers have the ability to read an HID format between Wiegand ranges of 26 bits to 37 bits. The default EM bit range is set to Wiegand 26 bits.
1. Specifications: Operating Voltage: 12 VDC
  2. Frequency: 125 kHz
  3. Card Type: EM card and HID card format
  4. Reading Distance: 1 3/8 to 3 1/8"
  5. Output: HID Wiegand 26 - 37, EM Wiegand 26
- B. The system shall be capable of working with HID Proximity Card Readers.

### **2.09 DOOR POSITION SWITCHES**

- A. Magnetic Contacts: Provided by Door Hardware Consultant. Coordinate integration with Door Hardware specifications.

### **2.10 ELECTRIC STRIKES**

- A. Electric Strikes: Provided by Door Hardware Consultant. Coordinate integration with Door Hardware specifications.
- B. Power to electric strikes to be furnished by the Electrical Contractor.

### **2.11 ELECTROMAGNETIC LOCKS**

- A. Provided by Door Hardware Consultant. Coordinate integration with Door Hardware specifications.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION OF SITE**

- A. Examine areas to receive an electronic access control system. Notify Architect/Engineer if areas are not acceptable. Do not begin installation until unacceptable conditions have been corrected.

### **3.02 INSTALLATION**

- A. Install an electronic access control system in accordance with the manufacturer's instructions.
- B. Centralized Distributed Power Management System and Boxed Power Supplies:
1. Configuration: Provide the least number of power supplies required to adequately serve doors with access control hardware and equipment.
  2. Dual-Path Failover and Redundancy: The centralized distributed power management system shall support the ability to failover to a secondary reliable, stable supply of electricity in the event that the primary electricity source fails under a variety of operating conditions. This failover will be seamless to the System Operator to ensure functionality when the primary power source is disconnected. The failover shall occur in less than 60

seconds from the time the primary power source goes offline, thus minimizing functional gaps. Acceptable options are:

- a. Backup Generator
  - b. Battery Backup
- C. Install system at locations as indicated on the Electronic Access Control System Schedule.
  - D. Use manufacturers supplied hardware.
  - E. Replace defective or damaged components as directed by the Engineer.
  - F. Furnish to the Owner all required keys and credentials.

### **3.03 FIELD QUALITY CONTROL**

- A. Test completed installation to verify each component of the electronic access control system is properly installed and operating.

### **3.04 ADJUSTING**

- A. Adjust and check each operating item of integrated access control door hardware, and each door opening to ensure proper secured operation and function of every unit. Replace units that cannot be adjusted to operate as intended.
  1. Integrated Access Control Products:
    - a. Provide a detailed schedule of doors and integrated lock functions tested.
    - b. Verify integrated lockset functional operation signals are being recognized.
      - 1) Present a compatible credential and verify LED and sounder activity.
      - 2) When a valid credential is presented to the card reader, the door unlocks.
      - 3) A change in Real-time door status monitoring is recognized when the door is not closed and latched.
- B. Adjust locksets for smooth operation without binding.
- C. Verify and obtain the owner's approval that all electronic door locks and software are operating correctly.

### **3.05 CABLE INSTALLATION**

- A. All cable shall be installed in accordance with Section 27 15 00
- B. All wiring shall be run "free-air" above accessible ceilings, in conduit, or in a secured metal raceway as designated on the plan drawings. All cable shall be free of tension at both ends.
- C. Size conduit per manufacturer's recommendations or per project plans, whichever is larger.

### **3.06 TESTING AND ACCEPTANCE**

- A. Conduct tests upon completion of all work or during the course of construction when identifiable portion(s) of overall work are complete.
- B. Owner's Construction Representative and Information Technology (IT) staff along with the Architect/Engineer may be in attendance to witness testing. Provide a minimum of one (1) week advance notice to allow for such participation. Failure to provide notification shall be grounds for the Owner/Engineer to reject any and all documentation of results on related testing and to require a repeat of the affected test.
- C. The test plan shall be established so as to not delay the project schedule. Obtain approval of schedule with the above parties before commencing with Acceptance Tests. The schedule shall allow time for the correction of defects and remedial work.
- D. Supply all equipment and personnel necessary to conduct acceptance tests.

- E. Perform tests related to connected equipment of others only with permission and presence of Contractor(s) responsible for that equipment.
- F. Should it be found by the Engineer that the materials or any portion thereof furnished and installed under this contract fail to comply with the specifications and drawings, with the respect or regard to the quality, amount of value of materials, appliances, or labor used in the work, it shall be rejected and replaced by the Contractor and all work distributed by changes necessitated in consequence of said defects or imperfections shall be made good at the Contractor's expense.
- G. Document all tests.

### **3.07 CLEANING**

- A. Clean surfaces in accordance with the manufacturer's instructions.
- B. Do not use abrasive cleaners.

### **3.08 TRAINING**

- A. Provide training for the owner's staff and/or contract maintenance personnel on an overview of the system and on operation and maintenance of equipment installed by the contractor.
- B. Coordinate with the Owner's Construction Representative and Architect/Engineer to schedule session(s). Provide adequate notification to allow the Agency to schedule staff.
- C. Training shall be held at the Project Site and shall be conducted during normal working hours.
- D. Provide one (1) Training Session.
- E. Training session duration shall be not less than four (4) hours and up to eight (8) hours.

### **3.09 MANUALS**

- A. Submit quantity three (3) O&M Manuals within ten (10) working days of the completed work.
- B. Provide hard copy documents per specification Section 26 05 00.
- C. In addition, provide all documents in electronic form (Adobe Acrobat PDF)
- D. As a minimum, O&M Manuals shall include:
  - 1. Drawings annotated to show as-installed camera locations, cable routes, and major equipment locations
  - 2. Cabling Schematics
  - 3. Approved Submittals
  - 4. Test plan and test report sheets
  - 5. Programming documents (pre-sets, tours, etc.)
  - 6. Hardware and software technical manuals
  - 7. Operator and maintenance manuals
  - 8. Troubleshooting Guidelines
  - 9. Equipment Rack Elevations

### **3.10 WARRANTY AND SUPPORT**

- A. This Contractor shall guarantee the following for a period of one (1) year from the date of substantial completion of this work:
  - 1. All provided materials and equipment
  - 2. Installation of all equipment, hardware, cabling, and related components.
  - 3. Warranties shall include labor, materials, and travel time.
  - 4. See Division 1, General Conditions, and General Requirements - Guarantee Documents and the individual technical sections for further requirements.



5. Contractor shall repair, replace, or alter systems or parts of systems that have failed, or found defective, or not meeting specified performance requirements. This shall be at no cost to the State.
6. If while fulfilling requirements of this warranty, the Contractor disturbs other work, the Contractor shall arrange for such disturbed work to be restored to its original condition by the responsible Contractor.

**END OF SECTION**

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SECTION 31 20 00

SITE PREPARATION

PART 1. GENERAL

1.01 SUMMARY

- A. Remove interfering or objectionable material from construction site.
- B. Preserve vegetation and existing objects designated to remain from injury or defacement.

1.02 DEFINITIONS

- A. Clearing:
  - 1. Cutting, removing, and disposing of trees, snags, stumps, shrubs, brush, limbs, and other vegetation growth.
  - 2. Removing evidence of their presence from the surface, inclusive of sticks and branches greater than 2" in diameter or thickness.
  - 3. Removing and disposing of trash piles, rubbish, and fencing.
- B. Grubbing:
  - 1. Removing and disposing of wood or root matter below the ground surface remaining after clearing.
  - 2. Includes stumps, trunks, roots, or root systems greater than 2" in diameter or thickness to a depth of 18" below the ground surface.

PART 2. MATERIALS

2.01 GENERAL

- A. Provide materials, suitable and in adequate quantity, required to accomplish Work of this Section.

PART 3. EXECUTION

3.01 PREPARATION

- A. Review with Engineer's representative the location, limits, and methods to be used prior to commencing Work under this Section.

3.02 CUTTING TIMBER

- A. Exercise care when clearing near the clearing limits to avoid damage to existing trees, vegetation, structures, or utilities which are outside of the clearing limits.
- B. Trees shall to be leveled into the area to be cleared.
- C. Flush cut stumps not designated for grubbing by cutting to within 2" of the ground surface.
- D. Timber is the property of the Contractor.
- E. Dispose of stumps, limbs, brush, snags, non-marketable timber, and other vegetative growth off-site.

3.03 PRESERVATION OF TREES, SHRUBS, AND OTHER VEGETATION

- A. Protect trees, shrubbery, and other vegetation from damage that is not designated for removal.
- B. Cut and remove tree branches only where, in the opinion of the Engineer, that cutting is necessary to effect construction operation.
- C. Remove branches other than those required to affect the Work to provide a balanced appearance of any tree, as approved prior to removal.
- D. Treat scars resulting from the removal of branches with an approved tree sealant.

3.04 CLEARING AND GRUBBING LIMITS

- A. Clear and grub areas within the limits of construction.
- B. Clear and grub in stages as the construction area is increased to avoid unnecessary clearing and grubbing.

3.05 DISPOSAL OF CLEARING AND GRUBBING DEBRIS

- A. Haul the material from the Work site and dispose of in accordance with state, federal, and local laws. Off-site disposal shall be at the Contractor's sole expense.

END OF SECTION

SECTION 31 21 00  
SUBSURFACE INVESTIGATION

PART 1. GENERAL

1.01 SCOPE

- A. It is to be expressly understood and acknowledged by the Bidder, that any information on subsurface materials made available by Owner or Engineer for Bidders convenience shall not be a part of the contract documents and there is no expressed or implied guarantee of the data given, nor of the interpretation thereof.

All excavation for this project will be unclassified and the Bidder shall be responsible for investigating and satisfying himself of subsurface conditions (including the presence of likelihood of encountering rock or rock-like materials) prior to submitting his bid, which shall include any and all costs Bidder associates with avoiding, managing or removing said subsurface conditions without claim for extra compensation against Owner.

- B. Soil Borings

The result of soil borings taken on the site are found at the end of this section. The locations of the borings are shown on the soil boring report found at the end of this section. Additional copies of the complete soils report may be obtained from the Engineer for the cost of reproduction.

- C. Detailed Boring Logs

Detailed boring logs for the project are presented at the end of this section. While the number and spacing of borings were chosen so as to decrease the possibility of undiscovered abnormalities for design purposes only, it is conceivable that soil conditions throughout the site may vary from those observed in the exploratory borings. Consequently, the Contractor should familiarize himself with the site and soil conditions prior to any bid.

- D. Availability of Required Soils

Select fill material required during construction may or may not be available on site. Any off-site borrow required to meet requirements of plans and specifications regarding fill materials shall be supplied by the Contractor at no additional expense to the Owner. Testing to determine the suitability of borrow materials shall be

performed at the Contractor's expense.

E. Geotechnical Report Recommendations

The Contractor shall follow all the specifications and recommendations outlined in the enclosed Geotechnical Report. This Geotechnical Report shall supercede any requirements specified and outlined in Sections 02200 and 02315 otherwise follow the requirements of these sections.

END OF SECTION

SECTION 31 26 00

CONTRACTOR'S TRENCH EXCAVATION SYSTEM AND SHORING SAFETY PLAN

PART 1. GENERAL

1.01 SCOPE

- A. This section shall cover the Contractor furnishing a Trench Safety System Plan and all labor and materials for installation and maintenance of the Trench Safety System.

1.02 APPLICATION

- A. For any trench excavation at a depth of five (5') feet or greater or where shown on the plans, provide trench safety system. Trench safety system shall be in accordance with details shown on Contractor's Trench Excavation and Shoring Safety Plan.

1.03 QUALITY ASSURANCE

- A. Trench safety system to meet appropriate requirements established in the Occupational Safety and Health Administration (OSHA) Safety & Health Regulations, 29 CFR 1926, Subpart P – Excavations, Trenching and Shoring, as may be amended, and OSHA's proposed standards on trenching excavation published in Volume 54, No. 209 of the Federal Register, October 31, 1989; Pages 45959-45991. Those standards are incorporated into these specifications by reference. Should the applicable OSHA standards be modified or amended, the more stringent standards shall apply.

1.04 SUBMITTALS

- A. The Contractor shall provide Trench Safety System Plan for Project prior to Award of the Contract. The Plan shall incorporate the detailed plans and specifications for a Trench Safety System conforming to OSHA standards. The Plan shall account for project site conditions, Contractor’s trench construction means, methods, techniques or procedures, the relationship of spoil to the edge of the trench, and Contractor’s equipment to be used in the construction of the project facilities requiring Trench Safety System(s). Contractor shall submit a certificate signed and sealed by a Registered Professional Engineer licensed in the State of Arkansas stating that Contractor’s Trench Safety System Plan has been designed in conformance with appropriate OSHA standards and applicable specifications as required by this item. Contractor’s Trench Safety System Plan shall demonstrate the type(s) of Trench Safety System to be used on the project.

1.05 MATERIALS

- A. The materials used in the Trench Safety System shall be furnished by the Contractor, as approved by the Owner, to comply with the requirements of the work of the Contractor as specified herein.
- B. Timber – Trench sheeting materials to be full size, a minimum of two (2”) inches in thickness, solid and sound, free from weakening defects such as loose knots and splits.
- C. Steel Sheet Piling – Steel sheet piling shall at a minimum conform to one of the following specifications:
  - 1. ASTM A328.
  - 2. ASTM A572, Grade 50.
  - 3. ASTM A690.

Steel for stringers (wales) and cross braces shall conform to ASTM A588.

- D. Steel Trench Boxes – Portable steel trench box shall at a minimum be constructed of steel conforming to ASTM Specification A-36. Connecting bolts used shall conform to Specifications ASTM A-307. Welds to conform to requirements of AWS Specification D1.1.
- E. Other Materials – Other materials to be utilized shall at a minimum conform to applicable ASTM standards.



1.06 INSTALLATION

- A. Trench safety system shall be constructed, installed, and maintained in accordance with the Trench Safety System Plan prepared by the Contractor’s Registered Professional Engineer.
- B. Timber Sheeting – Timber sheeting and size of uprights, stringers (wales), and cross bracing to be installed in accordance with Contractor’s plan. In no case shall the sizes of the timber sheeting members be less than, or the spacing greater than, those given in Table P-2 in OSHA Part 1926, Sub-part P – Excavation, Trenching, and Backfilling. Place cross braces in true horizontal position, spaced vertically, and secured to prevent sliding, falling, or kickouts. Cross-braces to be placed at each end of the stringers (wales), in addition to other locations required. Cross braces and stringers (wales) to be placed at splices of uprights, in addition to other locations required.
- C. Steel Sheet Piling – Steel sheet piling of equal or greater strength may be used in lieu of timber shoring shown in the OSHA tables (proposed standards). Drive steel sheet piling to at least minimum depth below trench bottom as recommended by Contractor’s Registered Professional Engineer providing design. Place cross braces in true horizontal position, spaced vertically, and secured to prevent sliding, falling, or kickouts. Cross braces to be placed at each end of stringers (wales), in addition to other locations required.
- D. Trench Boxes – Portable trench box may be used in lieu of timber trench shoring shown in the OSHA tables (proposed standards) and shall be designed to provide equal or greater protection than timber trench shoring shown in the OSHA tables. In cases where top of portable trench box will be below top of trench, the trench must be sloped to the maximum allowable slope for the soil conditions existing on the Project. In areas where a sloped trench will affect the integrity of existing structures, Contractor to protect structures prior to sloping trench.
- E. Trench Jacks – When trench jacks are used for cross bracing and/or stringers (wales), the trench jacks shall provide protection greater than or equal to the timber cross bracing shown in the OSHA tables (proposed standards). Trench jacks to be placed at each end of stringers (wales) in addition to other locations required.

1.07 SUPERVISION

- A. Contractor must provide competent supervisory personnel at each trench while work is in progress to ensure Contractor’s methods, procedures, equipment, and materials pertaining to the safety systems in this Item are sufficient to meet requirements of Arkansas Law and OSHA Standards.

1.08 MAINTENANCE OF SAFETY SYSTEM

- A. The safety system shall be maintained in the condition as shown on the Trench Excavation and Shoring Safety Plan as designed by the Contractor's Registered Professional Engineer. The Contractor shall take all necessary precautions to ensure the safety systems are not damaged during their use. If at any time during its use a safety system is damaged, personnel shall be immediately removed from the trench excavation area and the safety system repaired. The Contractor shall take all necessary precautions to ensure no loads, except those provided for in the plan, are imposed upon the trench safety system.

1.09 INSPECTION

- A. Contractor shall make daily inspection of trench safety system to ensure that the system meets OSHA requirements. Daily inspection to be made by competent personnel. If evidence of possible cave-ins or slides is apparent, all work in the trench shall cease until necessary precautions have been taken to safeguard personnel entering the trench. Contractor shall maintain permanent record of daily inspection.

1.10 REMOVAL

- A. Bed and backfill pipe to a point at least one (1') foot above top of pipe or other embedded items prior to removal of any portion of trench safety system. Bedding and backfill to be in accordance to other applicable specifications items. Backfilling and removal of trench supports shall be in accordance with Contractor's Trench Excavation and Shoring Safety Plan. Removal of trench safety system to be accomplished in such a manner to cause no damage to pipe or other embedded items. Remove no braces or trench supports until all personnel have evacuated the trench. Backfill trench to within five (5') feet of natural ground prior to removal of entire trench safety system.

END OF SECTION

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SECTION 31 30 00

EARTHWORK

PART 1. GENERAL

1.01 SUMMARY

- A. Perform earthwork.
- B. Meet requirements for excavation safety, or to facilitate construction due to wet conditions.
- C. Perform excavation regardless of type, nature, or condition of materials encountered.
- D. Contractor shall make his own estimate of the type and extent of the various materials to be excavated in order to accomplish the work.
- E. There will be no extra compensation for dewatering.

1.02 RELATED SECTIONS

- A. Section 01330 – Submittal
- B. Section 02200 – Site Preparation.
- C. Section 02315 – Trench Excavation, Backfill, and Compacting.
- D. Section 02950 – Site Restoration and Rehabilitation.

1.03 REFERENCES

- A. Arkansas Department of Transportation, Standard Specifications for Highway Construction, latest edition.
  - 1. ARDOT Section 303 – Aggregate Base Course.
- B. American Society for Testing and Materials, 1916 Race St. Philadelphia, PA 19103.
  - 1. ASTM D698 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5-lb. (2.49-kg) Rammer and 12" (304.8-mm) Drop.
  - 2. ASTM D1556 – Test Method for Density of Soil Place by the Sand-Cone Method.
  - 3. ASTM D1557 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 10-lb. (4.54-kg) Rammer and 18" (457-mm) Drop.
  - 4. ASTM D2216 – Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures.
  - 5. ASTM D3017 – Test Method for Moisture Content of Soil and Soil Aggregate in Place of Nuclear Methods (Shallow Depth).
- C. Occupational Safety and Health Administration (OSHA) Standard for Excavation and Trenches Safety System, 29 CFR 1926, Subpart P = Excavations.
- D. Arkansas Statute 291 of 1993.

1.04 DEFINITIONS

- A. Relative Compaction:
  - 1. The ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by the Standard Proctor Test, ASTM D698, or as determined by the Modified Proctor Test, ASTM D1557, as applicable.
  - 2. Corrections for oversize material may be applied to either the as-compacted field dry density or the maximum dry density, as determined by the Engineer.
- B. Optimum Moisture Content:
  - 1. Moisture content of the material for which the maximum dry density is obtained as determined by ASTM D698 or D1557.
  - 2. Field moisture contents shall be determined on the basis of the fraction passing the  $\frac{3}{4}$ " sieve.
- C. Completed Course: A course or layer that is ready for the next layer or the next phase of construction.

#### 1.05 SUBMITTALS

- A. Submit in accordance with Section 01330.
- B. Provide the following:
  - 1. Samples of imported material.
  - 2. Samples of onsite material to be used as fill.
  - 3. Certification that imported materials conform to the Specification requirements along with copies of the test results from a qualified commercial testing laboratory.
  - 4. Proctor curves on fill material as prepared by approved laboratory.

#### 1.06 PROJECT CONDITIONS

- A. Beginning work of this Section means acceptance of existing conditions.

### PART 2. PRODUCTS

#### 2.01 FILL

- A. Free from roots, organic matter, trash, and debris with maximum particle size of  $1\frac{1}{2}$ ".
- B. It is intended that structural backfill material be obtained from on site to the maximum extent possible.

#### 2.02 IMPORTED GRANULAR FILL

- A. Provide granular fill beneath structures as noted on Drawings.

- B. Imported granular fill to consist of a natural or artificial mixture of gravel and soil mortar, uniformly well graded from coarse to fine.
- C. Conform to the AHTD Section 303 classifications for Class 7 as designated on the Drawings.

2.03 TOPSOIL

- A. Selected topsoil at the site, properly stored and protected, free from roots, sticks, hard clay, and stones which will not pass through a 2" square opening.
- B. Provide imported topsoil of equal quality if required to accomplish the work.

2.04 COMPACTION EQUIPMENT

- A. Provide compaction equipment of suitable type and adequate to obtain the densities specified.
- B. Operate compaction equipment in strict accordance with the manufacturer's instructions and recommendations.
- C. Hand-operated equipment shall be capable of achieving the specified densities.

2.05 MOISTURE CONTROL EQUIPMENT

- A. Provide equipment for applying water of a type and quality adequate for the work; it shall not leak; and be equipped with a distributor bar or other approved device to assure uniform application.
- B. Provide equipment for mixing and drying out material consisting of blades, discs, or other approved equipment.

2.06 WATER REMOVAL EQUIPMENT

- A. Provide and operate equipment adequate to keep excavation and trenches free of water.

2.07 IMPORTED MATERIAL ACCEPTANCE

- A. Import only if insufficient material is available on-site.
- B. Locate and arrange use of a site near the construction area for obtaining borrow material.
- C. Additional tests required at the borrow area:
  - 1. Standard Proctor.
  - 2. Remolded permeability
  - 3. Atterberg limits.

- D. Upon completion of removal of borrow material, grade the site to drain, place topsoil on disturbed areas, and establish grass as outlined in Section 02950.
- E. Costs shall be the responsibility of the Contractor.

2.08 SELECTED MATERIAL ACCEPTANCE

- A. Provide samples for testing representative of the actual material to be installed in the work. Take samples from each 2,000 cubic yards of material stockpiled. Depending on the uniformity of the material, Engineer may request more frequent samples.
- B. Forward test results to the Engineer at least 10 days before the material is required for use. If tests indicate that the material does not meet Specification requirements, the material shall not be installed in the work.
- C. Material which is placed in the work but does not conform to the Specification requirements shall be removed and replaced at the Contractor's sole expense.

PART 3. EXECUTION

3.01 CLEARING AND GRUBBING

- A. Complete clearing and grubbing work as specified in Section 02200 prior to beginning work in this Section.

3.02 STRIPPING TOPSOIL

- A. Remove existing grass and overburden before excavating topsoil.
- B. Prior to beginning excavation or fill, strip the topsoil to a depth of at least 6" or to a depth sufficient to remove organic material and stockpile for future use.
- C. In general, remove topsoil where structures are to be built, trenches dug, and roads, parking lots, walks, and similar improvements constructed within the area presently covered with topsoil.
- D. Store topsoil clear of the construction area.
- E. Take reasonable care to prevent the topsoil from becoming mixed with subsoil or eroding.

3.03 STRUCTURAL EXCAVATION

- A. Contractor shall be solely responsible for trench and excavation safety systems in accordance with ACT 291 of 1993 and OSHA requirements.
- B. Identify required lines, levels, and grades.



- C. Identify known underground utilities. Contractor will be responsible for locating utilities.
- D. The method of excavation is optional; however, no equipment shall be operated in a manner that will endanger existing structures and their integrity.
- E. Use excavation support system such as sheet piling where ever necessary.
- F. Allow for forms, working space, granular base, and finish topsoil where shown on Drawings or required.
- G. Do not carry excavation for footings and slab deeper than the elevation shown on Drawings after allowing for base material.
- H. If undercutting occurs below the planned dirt grade, the same fill material as specified for backfill shall be placed and compacted to 95% Standard Proctor Density as defined in this Section up to the planned dirt grade in 8" lifts. Do not attempt to over compact excessively wet soil. Allow to dry first by scarifying and aerating before remolding.

3.04 DEWATERING EXCAVATION

- A. Remove water during periods when concrete is being deposited, pipe is being laid, and placing of backfill unless water settling is required, and at other times as required for efficient and safe execution of the work.
- B. Accomplish removal of groundwater in a manner that will preserve the strength of the foundation soils, will not cause instability of the excavation slopes, and will not result in damage to existing structures.
- C. Where necessary to these purposes, lower the water level in advance of excavation, utilizing wells, well points, or similar methods.
- D. Maintain the water level in the gravel stratum as measured in piezometers, a minimum of 3' below the prevailing excavation level or as needed to prevent bottom heave of the excavation.
- E. Open pumping, sumps, and ditches: If these result in boils, loss of fines, softening of the ground or instability of slopes, areas shall not be accepted.
- F. Install wells and well points with suitable screens and filters so that continuous pumping of fines does not occur.
- G. Operate well points continuously to prevent boils and loss of consolidation.
- H. Arrange discharge to facilitate collection of samples by Engineer.
- I. Avoid settlement or damage to adjacent property.
- J. Dispose of water in a manner that will not damage adjacent property, as approved.

3.05 GRANULAR FILL MATERIAL UNDER FACILITIES

- A. Place fill granular material as specified in Article 2.2 within the influence area beneath slabs, walks, structures, roads, and parking areas, and as shown on the Drawings.
- B. Do not exceed loose lifts of 6".
- C. Compact each lift to not less than 95% Modified Proctor Density.

- D. Place and compact a 6" layer of granular fill to at least 95% Modified Proctor density immediately beneath spread footings, slabs on grade, or other concrete structures.
- E. Moisten material as required to aid compaction ( $\pm 2$  percent optimum moisture).
- F. Place material in horizontal lifts and in a manner to avoid segregation.
- G. Correct and repair subsequent damage to slabs, piping, concrete structures, facilities, or other structures caused by settlement of fill material.

3.06 BACKFILL AND STRUCTURES

- A. Remove form materials and trash from excavation before placing backfill.
- B. Do not operate earth-moving equipment within 5' of walls of concrete structures for the purpose of depositing or compacting backfill material.
- C. Compact backfill adjacent to concrete walls with hand-operated tampers or similar equipment that will not damage the structure.
- D. Backfill water-holding basins only after satisfactory leakage tests have been conducted.
- E. Place earth fill in areas not designated to be structural fill or granular fill.
- F. Deposit material in maximum 6" loose lifts, and compact each lift to not less than 95% Standard Proctor.

3.07 FILL NOT BENEATH STRUCTURES OR FACILITIES

- A. Place earthen fill to the lines and grades shown.
- B. Place fill material in maximum 6" loose lifts and compact each lift to not less than 95% Standard Proctor.
- C. Make proper allowance for topsoil where required.

3.08 MOISTURE CONTROL

- A. During compacting operations, maintain optimum practicable moisture content required for compaction purposes in each lift of fill.
- B. Maintain moisture content uniform throughout the lift.
- C. Add water to the material at the site of excavation. Supplement, if required, by sprinkling the fill.
- D. At the time of compaction, maintain the water content of the material at optimum moisture content,  $\pm 2\%$ , except as otherwise specified for embankments.
- E. Do not attempt to compact fill material that contains excessive moisture.
- F. Aerate material by blading, discing, harrowing, or other methods, to hasten the drying process.

3.09 FIELD DENSITY TESTS

- A. Test Methods: ASTM D2922, D1556, D2216, and D3017.
- B. Cooperate with testing work by leveling small test areas designated by the Engineer.
- C. Backfill test areas.
- D. Field density test shall be performed for every 3,000 cubic yards of fill material placed.
- E. Engineer may order testing of lift of fill at any time, location, or elevation.

3.10 SITE GRADING

- A. Perform earthwork to lines and grades as shown on Drawings with proper allowance for topsoil where specified or shown on Drawings.
- B. Shape, trim, and finish slopes to conform with the lines, grades, and cross sections shown.
- C. Slopes shall be free of loose exposed roots and stones exceeding 3" diameter.
- D. Round tops of banks to circular curbs, in general, not less than a 6' radius.
- E. Neatly and smoothly trim rounded surfaces; over-excavating and backfilling to the proper grade are not acceptable.
- F. Finish site grading shall be reviewed by the Engineer.

3.11 DISPOSAL OF EXCESS EXCAVATION

- A. Dispose of excess excavated materials, not required or suitable for use as backfill or fill, outside of the area of work.
- B. Compact excess material as specified for fill, dress the completed disposal area to slopes no greater than 4:1 (horizontal:vertical), and slope to drain.

3.12 SETTLEMENT

- A. Settlement in backfill, fill, or in structures built over the backfill or fill, that may occur within the 1-year guarantee period in the General Conditions shall be considered to be caused by improper compaction methods.
- B. Restore structures damaged by settlement to original condition.

END OF SECTION

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**SECTION 31 31 16  
TERMITE CONTROL**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Chemical soil treatment.

**1.02 REFERENCE STANDARDS**

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate toxicants to be used, composition by percentage, dilution schedule, intended application rate.
- C. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements.
- D. Manufacturer's Certificate: Certify that toxicants meet or exceed specified requirements.
- E. Certificate of compliance from authority having jurisdiction indicating approval of toxicants.
- F. Manufacturer's Instructions: Indicate caution requirement.
- G. Maintenance Data: Indicate re-treatment schedule and \_\_\_\_.
- H. Warranty: Submit warranty and ensure that forms have been completed in Owner's name.

**1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing this type of work and:
  - 1. Approved by manufacturer of treatment materials.
  - 2. Licensed in the State in which the Project is located.

**1.05 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year installer's warranty against damage to building caused by termites.
  - 1. Include coverage for repairs to building and to contents damaged due to building damage. Repair damage and, if required, re-treat.
  - 2. Inspect annually and report in writing to Owner. Provide inspection service for \_\_\_\_\_ years from Date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 CHEMICAL SOIL TREATMENT**

- A. Toxicant Chemical: EPA Title 7, United States Code, 136 through 136y approved; synthetically color dyed to permit visual identification of treated soil.
- B. Diluent: Recommended by toxicant manufacturer.
- C. Mixes: Mix toxicant to manufacturer's instructions.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that soil surfaces are unfrozen, sufficiently dry to absorb toxicant, and ready to receive treatment.
- B. Verify final grading is complete.

### **3.02 APPLICATION - CHEMICAL TREATMENT**

- A. Comply with requirements of U.S. EPA and applicable state and local codes.
- B. Spray apply toxicant in accordance with manufacturer's instructions.
- C. Apply toxicant at following locations:
  - 1. Under Slabs-on-Grade.
  - 2. In Crawl Spaces.
  - 3. At Both Sides of Foundation Surface.
- D. Under slabs, apply toxicant immediately prior to installation of vapor barrier.
- E. At foundation walls, apply toxicant immediately prior to finish grading work outside foundations.
- F. Apply extra treatment to structure penetration surfaces such as pipe or ducts, and soil penetrations such as grounding rods or posts.
- G. Re-treat disturbed treated soil with same toxicant as original treatment.
- H. If inspection or testing identifies the presence of termites, re-treat soil and re-test.

### **3.03 INSTALLATION - SITE-APPLIED TERMITICIDE**

- A. Comply with manufacturer's written instructions.

### **3.04 PROTECTION**

- A. Do not permit soil grading over treated work.
- B. Protect sheet materials from damage after completed installation. Repair damage with manufacturer's recommended products and according to the manufacturer's written instructions.

**END OF SECTION**

SECTION 31 31 50

TRENCH EXCAVATION, BACKFILL, AND COMPACTING

PART 1. GENERAL

1.01 SUMMARY

- A. Work of this Section also includes:
  - 1. Replacing topsoil that contains regenerative material.
  - 2. Disposal of trees, stumps, brush, roots, limbs, and other waste materials from clearing operations.
  - 3. Imported topsoil.
  - 4. Crush rock backfill required by over-excavation.
  - 5. Imported pipe zone material.
  - 6. Trench settlement repair, including replacing roadway surfacing, sidewalk, or other structures.
  - 7. Replacing damaged culverts.
- B. Trench excavation is classified as common excavation and includes removal of material of whatever types encountered to depths shown or as directed by Engineer.
- C. Pipe zone includes full width of excavated trench from 6" below bottom of pipe to a point 6" above top outside surface of pipe barrel.
- D. Conform to federal, state, and local codes governing safe loading of trenches with excavated material.
- E. The right is reserved to modify the use, location, and quantities of the various types of backfill during construction as Engineer considers to be in the best interest of Owner.
- F. There shall be no additional payment for rock excavation.

1.02 RELATED SECTIONS

- A. Section 02534 – Sewage Force Main.

1.03 REFERENCES

- A. Arkansas Department of Transportation, P.O. Box 2261, Little Rock, Arkansas 72203
  - 1. ARDOT 303 – Aggregate Base Course.
- B. American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.
  - 1. ASTM D448 – Classifications for Standard Sizes of Aggregate and Bridge Construction.
  - 2. ASTM D698 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, using 5.5-lb. (2.49-kg.) Rammer and 12" (304.8-mm) Drop.
  - 3. ASTM D1557 – Test Methods for Moisture –Density Relations of Soils and Soil-Aggregate Mixtures, Using 10-lb. (4.54-kg.) Rammer and 18" (457-mm) Drop.

- 4. ASTM D6938 – Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- C. Occupational Safety and Health Administration (OSHA) Standard for Excavation and Trenches Safety System, 29 CFR 1926, Subpart P - Excavations.
- D. The Contractor shall be solely responsible for trench and excavation safety systems in accordance with Act 291 of 1993.

PART 2. PRODUCTS

2.01 FOUNDATION STABILIZATION

- A. Crushed gravel or crushed rock, free from dirt, clay balls, or organic material, well graded from coarse to fine, containing sufficient finer material for proper compactions, and meeting ASTM D448 Size No. 67 (Concrete Aggregate).

2.02 PIPE ZONE MATERIAL

- A. Select native material shall consist of fine loose earth or sand free from clods or rocks larger than ¾" in dimension and of proper moisture content for maximum consolidation.
- B. Crushed granular material conforming to ASTM D448, Size No. 7.
- C. Washed stone bedding size ¼" to ¾".

2.03 COMMON FILL MATERIALS

- A. Material shall not contain pieces larger than 3", and shall be free of roots, debris, or organic matter.

2.04 BEDDING MATERIAL

- A. Pea gravel, sand, or other locally available bedding material, as approved.
- B. Bedding material shall be a maximum of ¾" angular rock and 1½" rounded rock.

2.05 TRENCH BACKFILL

- A. Granular Backfill:
  - 1. Natural or artificial mixture of gravel and soil mortar uniformly well graded from coarse to fine.
  - 2. ARDOT Section 303 Class 3, Class 4, or Class 7 as specified in this Section.

2.06 PVC GRAVITY PIPE TRENCH



- A. Refer to Drawings for trench details.

2.07 COMPACTION EQUIPMENT

- A. Suitable type and adequate to obtain the amount of compaction specified.
- B. Operate in strict accordance with manufacturer’s instructions and recommendations and maintain conditions so that it delivers manufacturer’s rated compactive effort.

2.08 IMPORTED TOPSOIL

- A. Suitable sandy loam from an approved source.
- B. Possess friability and a high degree of fertility.
- C. Free of clods, roots, gravel, and other inert material.
- D. Free of quackgrass, horsetail, and other noxious vegetation and seed.

PART 3. EXECUTION

3.01 PREPARATION

- A. Where clearing or partial clearing of right-of-way is necessary, complete prior to start of trenching.
- B. Cut trees and brush as near to surface of ground as practicable, remove stumps, and pile for disposal.
- C. Do not permit excavated materials to cover brush or trees prior to disposal.

3.02 DISPOSAL OF CLEARED MATERIAL

- A. Dispose of cleared materials in a manner that meets or exceeds requirements of state, county, and local regulations regarding health, safety, and public welfare.
- B. Dispose of nonflammable and flammable material off the construction site in an approved location.
- C. Do not leave material on the Project site, shove onto abutting private properties, or bury in embankments or trenches.

3.03 REMOVAL OF OBSTRUCTIONS

- A. Remove obstructions within trench area or adjacent to trench area, such as tree roots, stumps, abandoned piling, logs, and debris.

- B. Engineer may, if requested, make changes in the trench alignment to avoid major obstructions, if such alignment changes can be made within the easement or right-of-way without adversely affecting the intended function of the facility.
- C. Dispose of obstructions in accordance with this Section.

3.04 REMOVAL AND REPLACEMENT OF TOPSOIL

- A. Where trenches cross lawns, garden areas, pasturelands, cultivated fields, or other areas on which reasonable topsoil conditions exist, remove topsoil for a depth of 6" for full width of trench to be excavated.
- B. Use equipment capable of removing a uniform depth of material, such as a scraper or motor grader; a backhoe shall not be considered suitable.
- C. Stockpile removed topsoil at regular intervals, and do not mix with other excavated material.
- D. Locate stockpiles so that material of one ownership is not transported and stockpiled on property of another ownership.
- E. Minimum Finished Depth of Topsoil over Trenches: 5".
- F. Imported topsoil may be substituted for stockpiling and replacing topsoil.
- G. Maintain finished grade of topsoil level with area adjacent to trench until final acceptance by Engineer.
- H. Repair damage to adjacent topsoil caused by work operations.
  - 1. Remove rock, gravel, clay, and other foreign materials from the surface.
  - 2. Regrade.
  - 3. Add topsoil as required.

3.05 TRENCH WIDTH

- A. Minimum width of unsheeted trenches where pipe is to be laid shall be 18" greater than the outside diameter of the pipe or as approved.
- B. Maximum width at top of trench shall not be limited, except where excess width of excavation would cause damage to adjacent structures or property or cause undue stresses on the pipe.
- C. Confine trench widths to dedicated rights-of-way or construction easements, unless special written agreements have been made with affected property owners.

3.06 EXCAVATION

- A. Material excavated is defined as unclassified excavation regardless of the material encountered.

- B. Excavate trench to lines and grades shown or as established by Engineer with proper allowance for pipe thickness and for pipe base or special bedding when required.
- C. If trench is excavated below required grade, correct with foundation stabilization material.
- D. Place material over full width of trench in compacted layers not exceeding 6" deep to established grade with allowance for pipe base or special bedding.

3.07 PREPARATION OF TRENCH – LINE AND GRADE

- A. Do not deviate more than 1/2" from line or 1/2" from grade. Measure for grade at the pipe invert, not at the top of the pipe, because of permissible variation in pipe wall thickness.
- B. Grade the bottom of the trench by hand to the line and grade where the pipe is to be laid, with proper allowance for pipe thickness and for pipe base when specified or indicated.
- C. Remove hard spots that would prevent a uniform thickness of bedding.
- D. Check the grade with a straightedge and correct irregularities found.
- E. The trench bottom shall form a continuous and uniform bearing and support for the pipe at every point between bell holes, except that the grade may be disturbed for the removal of lifting tackle.

3.08 SHORING, SHEETING, AND BRACING OF TRENCHES

- A. Sheet and brace trench when necessary to prevent caving during excavation in unstable material or to protect adjacent structures, property, workers, and the public.
- B. Increase trench widths accordingly by the thickness of the sheeting.
- C. Maintain sheeting in place until pipe has been placed and backfilled at pipe zone.
- D. Remove shoring and sheeting as backfilling is done in a manner that will not damage pipe or permit voids in backfill.
- E. Conform to safety requirements of federal, state, or local public agency having jurisdiction for sheeting, shoring, and bracing of trenches; the most stringent of these requirements shall apply.

3.09 LOCATION OF EXCAVATED MATERIALS

- A. Place excavated material only within construction easement, right-of-way, or approved working area.
- B. Do not obstruct private or public traveled roadways or streets.

3.10 REMOVAL OF WATER

- A. Provide and maintain ample means and devices to promptly remove and dispose of water entering trench during time trench is being prepared for pipe laying, during laying of pipe, and until backfill at pipe zone is completed.
  - 1. These provisions apply during the noon hour as well as overnight.
  - 2. Provide necessary means and devices, as approved, to positively prevent water from entering the construction area of another contractor.
- B. Dispose of water in a manner to prevent damage to adjacent property.
- C. Drainage of trench water through the pipeline under construction is prohibited.

3.11 FOUNDATION STABILIZATION

- A. When existing material in bottom of trench is unsuitable for supporting pipe, excavate unsuitable material.
- B. Backfill trench to subgrade of pipe base with foundation stabilization material specified.
- C. Place foundation stabilization material over the full width of trench and compact in layers not exceeding 6" deep to required grade by making passes with a vibratory compactor (or equivalent).
- D. Material shall be considered unsuitable when it contains more than 5% organic material by volumetric sampling or when it will not support a reading of 1.5 on a hand penetrometer.

3.12 ROCK IN PIPE TRENCH

- A. Where rock is encountered in bottom of trench, support pipe on bedding material.
- B. Minimum Bedding Thickness: 6" or 1/8 of the outside diameter of pipe, minimum.
- C. Extend bedding up pipe sides 1/2 of outside diameter of the pipe, minimum.
- D. Backfill over pipe according to pipe zone type.

3.13 PIPE ZONE BACKFILL

- A. Depth of the pipe zone above pipe barrel varies with pipe material.
- B. Particular attention shall be given to area of pipe zone from flow line to centerline of pipe to ensure firm support is obtained to prevent lateral movement of pipe during final backfilling of pipe zone.
- C. Backfill area of pipe zone from bottom of pipe to horizontal centerline of pipe by hand-placing material around pipe in 4" layers.
- D. Achieve continuous support beneath pipe haunches by "walking in" and slicing with shovel.

- E. Backfill area of pipe zone from horizontal centerline to top of pipe zone with pipe zone material as shown in trench details on Drawings.

3.14 TRENCH BACKFILL ABOVE PIPE ZONE

- A. When backfill is placed mechanically, push backfill material onto slope of backfill previously placed and allow to slide down into trench.
- B. Do not push backfill into trench in a way to permit free fall of material until at least 2' of cover is provided over top of pipe.
- C. Under no circumstances allow sharp, heavy pieces of material to drop directly onto pipe or tamped material around pipe.
- D. Do not use backfill material of consolidated masses larger than ½ cubic foot.

3.15 EXCESS EXCAVATED MATERIAL

- A. Dispose of excess excavated material off project site in an approved area.

3.16 DRAINAGE CULVERTS

- A. Replace drainage culverts that are removed on near right angles to pipe centerline.
- B. If pipe cannot be reused or is damaged during removal, dispose of it and provide new pipe.
- C. Protect culverts from damage or restore to equivalent condition.
- D. Replace culverts to existing lines and grades.
- E. Do not replace culverts until proposed pipeline is installed and backfill of trench has been completed to subgrade of culvert.

3.17 PIPE COVER

- A. Place select material from excavation over pipe to provide minimum coverage, as shown on Drawings or as directed by Engineer.

3.18 DRAINAGE DITCH RESTORATION

- A. Undercrossings of minor drainage ditches not covered in another Specification Section shall be backfilled so that upper 1' of material in ditch between ditch banks is clay.
- B. Compact material for full ditch width by six (6) passes of vibratory compactor (or equivalent).

- C. Where indicated on Drawings, provide concrete arch, or rip rap on ditch banks.

3.19 SETTLEMENT

- A. Correct settlement noted in backfill, fill, or in structures built over backfill or fill within warranty period.

3.20 IMPORTED TOPSOIL

- A. Should regenerative material be present in soil, remove both surface and root that appears within 1-year following acceptance of Project in a manner satisfactory to Owner.

END OF SECTION

**SECTION 32 33 13  
SITE BICYCLE RACKS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Exterior bicycle racks.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Mounting surface for bicycle racks.

**1.03 REFERENCE STANDARDS**

- A. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2020.
- B. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2016.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings: Indicate size, shape, and dimensions, including clearances from adjacent walls, doors, and obstructions.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Handle racks with sufficient care to prevent scratches and other damage to the finish.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Exterior Bicycle Racks:
  - 1. Basis of Design: Sonic Wave Bike Rack as supplied by Park Warehouse;  
<https://www.theparkcatalog.com/5-bike-sonic-wave-rack-galvanized>
  - 2. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 BICYCLE RACKS**

- A. Exterior Bicycle Racks: Device allows user-provided lock to simultaneously secure one wheel and part of the frame on each bicycle parked or racked.
  - 1. Style: Serpentine rack formed from a continuous round pipe.
  - 2. Capacity: Five bicycles.
  - 3. Mounting, Ground: In-ground anchor.
  - 4. Finish: Hot-dipped galvanized, maintenance-free and weather-resistant.
  - 5. Accessories: In-ground grout cover.
- B. Materials:
  - 1. Pipe: Carbon steel, ASTM A53/A53M, Schedule 40. 2-3/8-inch diameter pipe.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine surfaces to receive bicycle racks.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory conditions before proceeding.
- C. Do not begin installation until unsatisfactory conditions are corrected.

### **3.02 PREPARATION**

- A. Ensure surfaces to receive bicycle racks are clean, flat, and level.

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install level, plumb, square, and correctly located as indicated on drawings.
- C. In-Ground Anchor Installation:
  - 1. Prepare holes in size according to manufacturer's instructions.
  - 2. Place anchoring bolts through the holes in pipe.
  - 3. Lower rack into holes, ensuring the bottom of lower bends are at least 1-1/2 inch from the ground.
  - 4. Place concrete.
  - 5. Level rack before concrete sets.
  - 6. Support until dry.
- D. Post-Installed Anchors: Comply with ICC-ES AC308.

### **3.04 CLEANING**

- A. Clean installed work to like-new condition. Do not use cleaning materials or methods that could damage finish.

### **3.05 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

**END OF SECTION**



SECTION 33 00 00

GENERAL PIPING REQUIREMENTS

PART 1. GENERAL

1.01 WORK INCLUDED

- A. This section provides requirements for furnishing and installing piping for facilities. Refer to related work specified in other sections to coordinate the complete installation.
- B. All piping is identified on the drawings by its size and service. Unless noted otherwise, pipe, fittings, and general-purpose valves shall conform to those specified in the piping system specification sheet for that service. The piping system specification sheets are in alphabetical order at the end of this section. All special valves and other appurtenances shall be as specified herein.

1.02 RELATED WORK

- A. Division 1 - General
- B. Division 2 - Site Work
- C. Division 3 - Concrete
- D. Division 15 - Mechanical

1.03 PROJECT RECORD DOCUMENTS

- A. Upon completion of all work, furnish prints and tracings showing locations and principal details and modifications of piping systems as built.
- B. Furnish all information on buried piping and utilities encountered during construction.

1.04 SUBMITTALS

- A. Submit product data and shop drawings on each type of pipe, valves, fittings, fabricated piping, miscellaneous appurtenances, and accessories in accordance with Section 01330.

1.05 WELDERS CERTIFICATION

- A. Employ welders qualified by current certification in the positions required, to perform welding operations per American Welding Society requirements. Contractor shall submit documentation for all welders on the job.

PART 2. PRODUCTS

2.01 PIPING

All newly installed pipes and related products must conform to ANSI/NSI Standard 61 and must be certified by an organization associated with ANSI. All piping shall be manufactured in the United States. No foreign made pipe or fittings shall be allowed on this project.

- A. Ductile Iron Pipe
  - 1. Ductile iron pipe shall conform to the requirements of AWWA C-150 and AWWA C-151. Pipe installed above ground or within underground structures will be thickness Class 53 (minimum) for flanged or grooved end pipe. Pipe installed underground will be thickness Class 51 (minimum) for slip-joint pipe with "polywrap" coating applied per the manufacturer's guidelines.
  
- B. Steel Pipe
  - 1. Black steel pipe for pressure less than 150-psi ambient temperatures shall be ASTM A 53 (ANSI B 125.1) or ASTM A 135 (ANSI B125.3), grade B seamless (smaller than 24") or electric-resistance welded (for 24" and larger) black steel or hot dipped galvanized standard weight unless otherwise noted.
  - 2. Stainless steel pipe shall be ASTM A 312 (ANSI B135), Grade TP 304L seamless and welded stainless pipe.
  
- C. Polyvinyl Chloride Pipe (PVC)

1. PVC pipe shall be Type 1, grade 1, manufactured in accordance with ASTM D 1785 (ANSI B72.7) and ASTM D 1784. Underground pressure piping shall meet ASTM D2241-SDR 21 rated at 200-psi or AWWA C900 Class 100 DR-25 or AWWA C900 Class 150 DR-18 or UNI-BELL B-11-DR-25 or better. Gravity sewer lines shall meet ASTM D3034-SDR 35 or ASTM F789-PS46 or ASTM F679-PS46. For water treatment plant sites: all sewer lines shall be AWWA C900 Class 150 DR-18.

Perforated PVC pipe shall meet ASTM F758-PS46.

2. All PVC pipe shall be manufactured from virgin plastic.

D. Reinforced Concrete Culvert Pipe

1. All reinforced concrete pipe to be used for culverts shall comply with ASTM C76, Class III.

E. Fiberglass Reinforced Polyester Pipe

1. All fiberglass reinforced polyester pipe to be used for culverts shall comply with ASTM D3262 and be a minimum stiffness class (SN) of 36.
2. All fiberglass reinforced polyester pipe to be used for pressured systems or force mains shall comply with AWWA C950 or ASTM D3754 and be a minimum stiffness class (SN) of 36.

F. Copper tubing

1. All copper tubing for water service lines shall be type "K" and shall conform to ASTM Standard "Seamless Copper Water Tube" B1785, latest revision.

## 2.02 UNIONS

A. Malleable Iron Unions

1. Use 150-pound standard (300-pound WOG) malleable iron, ground joint unions with bronze seat. Provide flanged union joints on piping 2½" and larger. Use service galvanized unions for galvanized pipe. Use insulating unions where indicated, or required, where joining dissimilar metals.

B. Polyvinyl Chloride (PVC) Unions

1. Use Schedule 80 threaded PVC unions.

2.03 COUPLINGS, GASKETS, AND FITTINGS

A. Flanges, Gaskets and Bolts

Cast iron flanges shall conform to ANSI B16.1. Flange gaskets shall be full-face type, suitable for the intended service. Substitution of other gasket materials shall be only with the express written consent of the Engineer. Thickness shall be 1/16" for pipe 10" and less and 1/8" for larger pipe. Flange assembly bolts shall be standard square head carbon steel machine bolts with heavy, hot pressed, hexagon nuts, ANSI B18.2. Threads shall conform to ANSI B1.1, coarse thread series, Class 2 fit. Bolt length shall be such that after joints are made up the bolt shall protrude through the nut, but not more than 1/2". Bolts for use in submerged service shall be galvanized. All screwed flanges on cast iron pipe shall be refaced, as required, after fabrication to ensure that pipe ends are flush with face of flange.

Forged steel flanges shall conform to ANSI B16.5, R.F. Flange gaskets shall match raised faces. On 3 1/2" flanges and smaller, gaskets shall be 1/16" thick. On 4" flanges and larger, gaskets shall be 1/8" thick. Flange assembly bolts shall be standard square head carbon steel machine bolts with heavy, hot pressed hexagon nuts, ANSI B18.2. 150-psi steel flanges may be bolted to cast iron valves, fittings or other parts, having either integral Class 125 cast iron flanges or screwed Class 125 companion flanges. When such construction is used, the raised face on the steel flange shall be removed.

B. Pipe Threads

Unless noted otherwise, all pipe threads shall conform in dimensions and limits of size to ANSI B2.1, taper joint thread.

C. Flange Coupling Adapters

Flanged coupling adapters shall be Smith Blair 912-913 or approved equal. Coupling gaskets shall be as recommended by the coupling manufacturer for the service intended.

D. Mechanical Pipe Couplings

Mechanical pipe couplings shall be Smith Blair #441 or approved equal. Coupling gaskets shall be as recommended by the coupling manufacturer for the service intended. Mechanical pipe couplings for buried cast or ductile iron shall be ductile iron couplings.

E. Compression Fittings

Compression fittings for copper pipe shall be Dresser Style 88, McDonald, or approved equal.

F. Joints

Joints of mechanical installations inside structures, and of yard piping shall be as detailed on the Plans. Where not detailed on the Plans, such joints shall be mechanical type or push-on type, except that the first joint outside of buildings shall be mechanical type, and pipelines installed under structures shall be a mechanical joint pipe.

All other joints shall be mechanical type or push-on type. Lubricant for push-on type shall be that recommended by the manufacturer of the pipe.

- G. Provide gaskets of neoprene, unless otherwise noted.
- H. Provide full face gaskets or flat faced and ring gaskets for raised face flanges. Use 1/16" thick gaskets for pipe smaller than 6" and 1/8" thick gaskets for pipe 6" and larger. Gasket dimension shall conform to ANSI B16.21.
- I. Provide insulating flange gasket kit where indicated, or required, where joining dissimilar metals or pipe materials.

## 2.04 VALVES

### A. General

Valves shall be as specified in Section 15110 - Manually Operated Valves, or as specified herein. A union or flanged connection shall be provided within 2' of each threaded end valve unless the valve can be otherwise easily removed from the piping. Unless otherwise indicated, the direction of rotation of the valve operating wheel, wrench nut, or lever shall be to the left (counterclockwise) to open the valve.

All valves, except those equipped with power operators shall be provided with manual operators. Unless otherwise specified, each manual operator shall be equipped with an operating wheel.

Chain wheels and operating chains shall be provided on all valves 4" and larger with centerline more than 7'6" above the floor, except where other operator types are specifically required. Each chainwheel operated valve shall be equipped with a chain guide which will permit rapid handling of the operating chain without "gagging" of the wheel and will also permit reasonable side pull on the chain. Operating chains shall be heavily plated with zinc or cadmium and shall be looped to extend to within 4' of the floor below the valve. Where recommended by the manufacturer, the operator shall be provided with a hammer blow wheel.

Wrench nuts shall be provided on all buried valves, on all valves which are to be operated through floor boxes, and where shown. All wrench nuts shall comply with Section 20 of AWWA C-500. Not less than two operating keys shall be provided for operation of the wrench nut operated valves.

For all valves buried at a depth of greater than 3', an extension stem shall be provided to bring the operating nut within 3' of the finished elevation.

**B. Gate Valves**

The bearing, moving, or wearing parts of all gate valves shall be either of solid bronze or faced with bronze. Bronze facings shall be securely fastened to the iron castings. On valves 12" and smaller, all wedging surfaces may be Grade I, II, or III bronze to iron, but not iron to iron. All material shall be of the best quality and especially adapted for the service required, and workmanship shall be first class in all respects.

Gate valves shall conform to the current specifications of the American Water Works Association and shall be designed for a minimum water working pressure of 150-psi, unless otherwise specified on the Plans. Gate valves shall have a clear water way equal to the full nominal diameter of the valve and shall be opened by turning to the left. Each valve shall have the maker's initials, pressure rating, and year in which the manufacturer cast the body. Each valve shall have a non-rising stem, unless otherwise shown on the Plans.

All valves shall be equipped with "O" ring stem seals. Valves located inside structures shall be wheel operated, unless otherwise shown on the Plans. Valves in the ground shall be nut-operated. Gate valves located outside of structures shall be mechanical joint, or special rubber gasket joint, unless otherwise specified.

Except as may be otherwise approved by the Engineer, all gate valves required for this Contract shall be from one manufacturer, and similar types and sizes shall be identical and the parts interchangeable.

C. Ball Valves

Ball valves may be used in piping systems 2" in diameter and smaller. Valves shall be plastic or steel for line pressure up to 100-psi, and steel for pressures over 100-psi.

Plastic ball valves shall be constructed from thermoplastic polyvinyl chloride. Valves shall be of the cartridge type, with locked-in seal carriers, ethylene propylene rubber "O" ring seals, and Teflon seats. Valves shall be double entry, true-union threaded and coupled. Where shown on the Plans, furnish flanged valves with 125-psi flanges. Plastic ball valves shall be as manufactured by Balon Corporation, Oklahoma City, OK, or approved equal.

Steel ball valves shall be of 2-piece construction with internally seated stem. Provide precision machined mating surfaces, stem stop integral with body, and multi-seal seats. Ball shall be plated and polished. Provide each valve with lever operator. Steel ball valves designed for general service applications up to 1000-lbs. working pressure shall be as manufactured by Balon Corporation, or equal.

D. Valve Marking

All exposed valves shall be tagged with identifying numbers as shown on the Drawings. Tags shall be 2" diameter brass, Style No. 300-BL as manufactured by Seton Name Plate Corporation, or approved equal. Tags shall be fastened with brass chain and "S" hooks.



E. Backflow Preventers

Backflow preventers shall be of the reduced pressure principal type conforming to the applicable requirements of AWWA C-506, and shall be as manufactured by Watts or FEBCO.

F. Valve Boxes

Cast iron valve boxes extending to the finished or established ground or paved surfaces shall be provided for all buried valves. They shall have suitable base castings to fit properly over the bonnets of their respective valves and heavy top sections with stay-put covers. Boxes shall be of the screw or sliding type having 5¼" shaft diameter or greater. Covers shall be marked with the class of service. A concrete pad 1'6" x 1'6" x 4" thick shall be poured around the valve boxes.

2.05 FREEZE PROTECTION

All exposed piping, valves, or equipment shall be provided with freeze protection. The freeze protection shall consist of copper sheath, resistance type heating cable and 1" of insulation. The heating cable shall be designed to keep the contained fluid 50°F above ambient temperature. The heating cable shall be suitable for 110 V, single phase operation and ON-OFF switches for the tape shall be provided at each area of piping or equipment. The insulation shall be as specified in P1.11 except that preformed insulation must be oversized to allow for the heating cable.

PART 3. COATINGS AND LININGS

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3.01 GENERAL

- A. Coatings and linings are specified on the piping system specification sheets and shall conform to this section.

3.02 CEMENT MORTAR LINING

- A. Cement mortar lining shall be for cast or ductile iron pipe and fittings and shall be standard thickness lining conforming to AWWA C104 (ANSI A241.4).

3.03 POLYETHYLENE ENCASEMENT

- A. Polyethylene encasement for all buried cast or ductile iron pipe, fittings, and valve shall conform to AWWA C105 (ANSI A21.5).

3.04 EXTRUDED PLASTIC COATING

- A. Extruded plastic coating for steel pipe shall be a high-density polyethylene, or polypropylene copolymer, extruded to cover an adhesive first coat, to form a combined adhesive-extruded thermoplastic resin coating conforming to Federal Specification L-C 530B, Type 1. The first coat shall consist of rubber, asphalt, fluxing oil, and high molecular weight resin. Extruded plastic coatings shall have a minimum combined thickness of adhesive and thermoplastic of 33-mils for pipe up to and including 2" nominal diameter, 37-mils up to 3", 42-mils up to 5", and 46-mils for all pipe larger than 5" nominal diameter. Joints, for pipe and fittings having extruded plastic coating, shall be covered by plastic sleeves fabricated from

radiation cross-linked, semi-rigid polyethylene, coated on the inside with a specifically formulated thixotropic adhesive, which when heated, shall shrink to encapsulate the joint with a strong impervious seal.

3.05 GALVANIZING

- A. Galvanizing shall be in accordance with ASTM A153.

3.06 PIPE SUPPORTS

- A. All exposed piping shall be supported in conformance with the pipe support and structural attachment details per the plans.

3.07 PIPE INSULATION

- A. All above-ground outdoor piping shall be insulated with 2" J-M650 Micro-lok fiberglass pipe insulation material or equal. This material shall be covered with ASJ and stapled into place with outward clinching staples 2" O.C. Fittings and valves shall be covered with the same material and sealed with Childers CP-11 weather proofing. All insulation shall be weatherproofed with a jacket of 0.016" smooth aluminum held in place with stainless steel screws 6" O.C. Fittings shall be weatherproofed with premolded PABCD fitting covers or equal.

3.08 JOINT RESTRAINT

- A. Joint restraint shall be provided at ALL buried fittings. The joint restraint systems shall be as manufactured by EBAA Iron for 3" and larger and MIDCO for 2" or approved equal. All elbows, reducers, and laterals of all tees shall have EBAA Megalug or MIDCO restraint. Laterals with swivel glands will be excluded. Size and number shall be as shown or the minimum recommended by the manufacturer for the pipe size and service.

### 3.09 PROTECTION OF BURIED STEEL PIPE, VALVES, AND APPERTENANCES

- A. All steel pipe installed underground shall be protected as specified. All buried valves, flanges, mechanical joints and mechanical pipe couplings shall be protected with a built-up asphalt mastic coating covered with a protective tape wrap. Surfaces shall be cleaned by wire brushing immediately prior to application of the mastic. The mastic shall be molded firmly to encase all bolts, nuts and flanges, and built up to a uniform surface over entire fitting. The build-up surface shall be covered with a protective tape wrap. Materials shall be applied in full accordance with manufacturer's recommendations. Coating shall be Type M-1 (LT) Denso Plast with Denso (LT) tape, Protectowrap tap, or approved equal.

## PART 4. EXCAVATION

### 4.01 PIPE EMBEDMENT FOR PVC PIPE

- A. Pipe embedment shall consist of bedding, haunching, and initial backfill materials as shown on the standard detail sheets of the Plans. The class of material to be used below and above the pipe and placement and compaction of embedment materials shall conform to the requirements shown on the Plans and to the following specifications.

- B. Embedment Materials: The following are descriptions of the classifications of embedment materials which may be used for pipe embedment as shown on the standard detail sheets of the Plans:
1. Class I: Angular graded stone ( $\frac{3}{4}$ " maximum), including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.
  2. Class II: Fine sand and clayey gravels, including fine sands, sand/clay mixtures, and gravel/clay mixtures.

Where approved by the Engineer, good sound earth may be classified as Class II embedment. Good sound earth is defined as gravel, sand, sandy loam, or loam free from excessive clay and silt.

- C. Bedding Placement and Composition: Prior to pipe installation, carefully bring the bedding material to grade along the entire length of the pipe to be installed. To ensure that adequate and uniform support is provided under the pipe and to avoid differential settlement of the pipe, certain procedures should be adhered to and precautions taken as outlined herein. Blocking shall not be used to bring the pipe to grade.
1. Class I Bedding: When Class I material is used for bedding, little or no compaction is necessary due to the nature of the angular particles. A depth of 6" of Class I material is sufficient to provide uniform bedding. If Class I material is used for bedding, it must also be utilized for haunching at least up to the spring line of the pipe to avoid loss of side support through migration of Class II hunching material into the bedding.
  2. Class II Bedding: Care must be taken with Class II material to provide a uniformly compacted bedding. Place the bedding material to a point above the pipe bottom such that resulting compaction will bring the material to grade. Use hand or mechanical tamping to compact the bedding material to a minimum 90% Standard Proctor Density. Slightly damp material will generally result in maximum compaction with a minimum of effort. If water is added to improve compaction or if water exists in the trench, take care to avoid saturation of Class II material, which could result in additional stability problems of the bedding. Carefully bring the surface of the bedding to grade

after compacting it.

D. Haunching and Initial Backfill Placement and Compaction:

1. Class I Material:

Wet Conditions: In any area where the pipe will be installed below existing or future ground water levels or where the trench could be subject to inundation, Class I material when used, shall be placed to the top of the pipe.

A minimum of effort is needed to compact the material. However, in the initial stage of placing this type of material, take care to ensure that sufficient Class I material has been worked under the haunch of the pipe to provide adequate side support. Take precautions to prevent movement of the pipe during placing of the material under the pipe haunch. Except for the protection of the pipe from large particles of backfill material, little care need be taken and no compaction is necessary in placing initial backfill to a distance of 6" above the top of the pipe.

Dry Conditions: In any area where ground water will not be experienced at any time above the level of the foundation material or where the trench will not be subject to inundation, place Class I material to the spring line of the pipe. Follow the procedure described above for placing Class I material in wet conditions. If Class II material is used for initial backfill above the spring line, achieve compaction consistent with SECTION 4.01.D.(2) below.

2. Class II Material: Place Class II material with care under the lower haunch area of the pipe, compact, and then place additional material to the spring line of the pipe. If care has been taken to shape the bedding material to the curvature of the pipe, only one stage of placement will be required to bring the haunching material to the spring line of the pipe. In either event,

thoroughly compact the haunching material to a minimum of 90% Standard Proctor Density. Take precautions to prevent movement of the pipe during placing of material under the pipe haunch. Place initial backfill material in two stages; one to the top of the pipe and the other to a point at least 6" over the top of the pipe. Compact each stage of haunching and initial backfill by hand or mechanical tamping to a minimum of 90% Standard Proctor Density.

#### 4.02 PIPE EMBEDMENT FOR RIGID PIPE

- A. All pipe other than PVC shall conform to the following embedment specifications.
- B. Pipe embedment shall consist of bedding, haunching, and initial backfill materials as shown on the standard detail sheets of the plans. The class of material to be used below and above the pipe and placement and compaction of embedment materials shall conform to the requirements shown on the plans and to the following specifications:
- C. Embedment Materials: The following are descriptions of the classifications of embedment materials which may be used for pipe embedment as shown on the standard detail sheets of the plans:
  - 1. Class I: Shall be described in SECTION 4.02.D.(1).
  - 2. Class II: Suitable native material including fine sands, sandy clay mixtures, and gravel/clay mixtures.
- D. Bedding Placement and Composition: Prior to pipe installation, carefully bring the bedding material to grade along the entire length of the pipe to be installed. To ensure that adequate and uniform support is provided under the pipe and to avoid differential settlement of the pipe, certain procedures should be adhered to and precautions taken as outlined herein. Blocking shall not be used to bring the pipe to grade.

1. Class I Bedding: The bedding shall have a minimum thickness beneath the pipe of 4" or  $\frac{1}{8}$  of the outside diameter of the pipe, whichever is greater, and shall extend up the sides of the pipe to spring line of the pipe. Backfill from pipe spring line to 6" above the top of the pipe shall be of the bedding material or carefully placed earth. Hand placed backfill shall be finely divided materials free from debris, organic material, and stones.
2. Class II Bedding: The pipe shall be bedded in suitable native material on an unshaped trench bottom providing uniform and continuous support of pipe barrel between bell or coupling holes. After each pipe has been placed to grade, aligned, and placed in final position, deposit sufficient bedding material under the pipe haunches and one each side of the pipe to hold the pipe in proper position during subsequent pipe jointing, bedding, and backfill operation. Deposit bedding material uniformly and simultaneously on each side of the pipe to prevent lateral displacement. Bedding material shall be hand or mechanically tamped to a minimum of 90% Standard Proctor (Density) to a point 6" above top of the pipe.

Trench backfill from a point 6" above the top of the pipe shall be as described in SECTION 4.03.

#### 4.03 TRENCH BACKFILL

- A. Backfilling from a point 6" above the pipe to the top of the trench shall be done with good earth and shall be free of large rocks. No material of a perishable, spongy or otherwise unsuitable nature shall be used in backfilling.

Where trenches are not under paved areas or proposed structures, backfill need not be mechanically tamped. Before reaching the top of the trench, the trench shall be flooded with water to achieve some degree of consolidation. Consolidation with heavy equipment shall not be allowed.



Where trenches are under paved areas or proposed structures, the entire trench shall be backfilled with select materials and compacted to a density of 95% ASTM D-698 or better.

The backfill of materials to be placed under paved areas or proposed structures shall be compacted with mechanical devices manufactured for that purpose from the top of the pipe to the top of the existing or proposed subgrade.

4.04 TESTING

In Place moisture-density test may be ordered by the Engineer to insure that all trench backfill complies with the requirements of the specification. Tests will be performed by a recognized testing laboratory, and all costs will be paid for by the Contractor. Copies of all test results will be furnished to the Owner.

4.05 SPECIAL PROBLEMS

- A. When the pipe being installed is provided with elastomeric seal joints, bell holes shall be excavated in the bedding material to allow for unobstructed assembly of the joint. Care should be taken that the bell hole is no larger than necessary to accomplish proper joint assembly. When the joint has been made, the bell hole should be carefully filled with bedding or haunching material to provide for adequate support of the pipe throughout its entire length.
  
- B. Before the trench is wheel-loaded, provide cover in accordance with pipe manufacturer's recommendation. Where pipelines are less than 36" deep, avoid the use of heavy equipment across these lines.

- C. Take care to avoid contact between the pipe and compaction equipment. Compaction of haunching, initial backfill, and backfill material should generally be done in such a way so that compaction equipment is not used directly above the pipe until sufficient backfill has been placed to ensure that such compaction equipment will not have a damaging effect on the pipe.
  
- D. If sheeting or other trench protection is removed, take care so as not to disturb previously constructed foundation bedding, haunching, and initial backfill. If it has been necessary to place or drive sheeting or other trench protection below the top of the pipe, consideration should be given to leaving in place this portion of the sheeting or trench protection, since its removal could jeopardize the side support necessary for the pipe.

4.06 GENERAL

This section covers the laying of piping.

- A. Gravity Sewer Lines and Drains
  - 1. Each joint of pipe shall be inspected carefully before being placed in the trench. Any joint found to be cracked, or otherwise so damaged as to impair its usefulness, shall be plainly marked in such a manner that the marking will not rub or wash off. Damaged joints shall be removed from the site as soon as feasible.
  - 2. All pipe shall be laid with the bell up-stream. Each pipe shall be laid to plan line and grade, or to line and grade directed by the Engineer, using batter boards and top line, or laser beam grade light. Where batter board and top line is used, each pipe shall be plumbed for line with plumb bob, and graded for elevation with a grade stick. Care shall be taken that each spigot is centered properly in the bell of the preceding pipe and properly seated, and that each pipe is solidly bedded. As the work progresses, the pipes shall be cleaned of all dirt and other foreign matter. They shall be maintained clean until accepted or put in service.

3. At the end of each day's work, and when for any reason the laying of pipe will be discontinued for an appreciable period, the open ends of the pipe line shall be closed temporarily.
4. The cutting of pipe for any reason shall be done in a neat and workmanlike manner without damage to pipe or pipe lining.
5. Pipe shall be lowered carefully into the trench in such manner that spigot and bell will not become contaminated. Spigot and bell shall be checked for cleanliness immediately before insertion of spigot into bell.
6. Proper facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall pipe be laid in water and no pipe shall be laid when trench conditions or weather are unsuitable for such work. Full responsibility for the diversion of drainage and for dewatering of trenches during construction shall be borne by the Contractor.
7. Spigot and bells shall be cleaned thoroughly before the application of lubricant and attachment of the preformed joint gasket. Application of lubricant and attachment of the gasket shall be in strict accord with the joint.
8. Pipe shall not be placed in the trench without excavating for bells so that the entire barrel of the pipe is uniformly supported on the pipe bedding.
9. Pipe shall be supported to proper line and grade, and secured against upheaval or floating during the placement of concrete bedding or encasement.

B. Pressure Mains

1. All pipe and fittings shall be installed to the line and grade as detailed on the plans. Subject to the approval of the Engineer, other fittings may be added to or substituted for those shown on the plans, should the need therefore arise during construction. This permissive stipulation in no way shall relieve the Contractor of the responsibility for furnishing and installing all fittings required for a complete and proper installation of main as detailed on the plans.
2. All dirt and other foreign matter shall be removed from the inside of pipe and fittings before they are lowered into the trench. They shall be kept clean during and after laying, care shall be taken to keep dirt out of the jointing space. At the end of each days work, and when pipe laying is discontinued for an appreciable period, open ends of pipe shall be closed with a cast plug or cap firmly secured in place.
3. All pipe and fittings shall be lowered carefully into the trench in such manner as to prevent damage to pipe, fittings, or linings. Neither pipe nor fittings shall be dropped or dumped into the trench.

4. Cutting of pipe, where needed, shall be done in a neat and workmanlike manner without damage to pipe or pipe lining.
5. Unless otherwise directed by the Engineer, pipe shall be laid with bell ends facing in the direction of laying. For lines on an appreciable slope, bells shall, at the direction of the Engineer, face upgrade. Wherever necessary to deflect pipe from a straight line in either the horizontal or vertical plane, to avoid obstructions, or for other allowable reasons, the degree of deflection at any joint shall not exceed the maximum recommended by the pipe manufacturer.

C. Connections to Existing Sewers and Drains

1. Connections to existing sewers and drains shall not be made until all of the proposed piping and manholes have been constructed, cleaned and approval granted by the Engineer for making connection. No connection to existing sewers and drains shall be made until new lines have passed specified leakage tests.
2. All work shall be completed in a workmanlike manner using materials specified or as approved by the Engineer. Watertight connections shall meet with the requirements concerning tests of these specifications.

D. Installation of Slip-Type Joints

1. Prior to jointing, the bell and spigot ends of the pipes, and bells of fittings, shall be cleaned thoroughly with soapy water and cloth, and by whatever additional means as are necessary to remove all foreign matter and attain the required cleanliness. A wire brush shall be used as necessary. Particular care shall be exercised to clean the gasket seat. The gland also shall be cleaned in like manner.
2. Joints shall be made in strict accord with the recommendations of the pipe manufacturer. The rubber gasket shall be cleaned with soapy water and cloth, and inserted in the gasket seat within the bell. The spigot end of the pipe shall be inserted in the bell of the pipe to which connection is being made, and forced to a firm contact with the shoulder of the bell. When this initial insertion is made, the alignment of the added pipe shall deviate from true alignment not more than the amount recommended by the pipe manufacturer.
3. Following the initial insertion, the bell end of the added pipe shall be moved sideways or up a distance of approximately 8" to move the spigot end slightly

away from the shoulder of the connecting bell, thus providing for expansion and flexibility in the completed line. The added pipe then shall be placed in true alignment at intended grade.

E. Installation of Mechanical Joints

1. The spigot end of pipe and the bell of fitting, and the rubber gasket, shall be cleaned thoroughly as specified for pipe joints in Paragraph D above. The gland also shall be cleaned in like manner.
2. After the gland and gasket are placed on the spigot end of the pipe a sufficient distance from the end to avoid fouling the bell, the spigot end shall be inserted in the bell to firm contact with the bell shoulder. The rubber gasket then shall be advanced into the bell and seated in the gasket seat. Care shall be exercised to center the spigot within the bell.
3. The gland shall be brought into contact with the gasket, all bolts entered and all nuts made hand tight. Continued care shall be exercised to keep spigot centered in bell. The joint shall be made tight by turning the nuts with a wrench; first partially tightening a nut, then partially tightening the nut 180° therefrom, and working thus around the pipe, with uniformly applied tension until the required torque is applied to all nuts. Required torque ranges and indicated wrench lengths for standard bolts are as follows:

Diameter, <u>Inches</u>	Range of Torque <u>Foot-Pounds</u>	Length of Wrench, <u>Inches</u>
5/8	40 - 60	8
3/4	60 - 90	10
1	70 - 100	12
1 1/4	90 - 120	14

4.07 TRENCH SAFETY SYSTEMS

- A. Refer to Section 02260 of these Technical Specifications.

#### 4.08 PLASTIC PIPE

- A. Installation shall be in accordance with applicable ASTM Standards D 2774, D 2855 and F 402. The CONTRACTOR shall make certain before jointing polyvinyl chloride pipe that the ring groove in the bell of the pipe is clean, with no dirt or foreign material that could interfere with proper seating of the ring. Make sure pipe end is clean. Wipe with a clean dry cloth around the entire circumference from the end to 1" beyond the reference mark. Lubricate the spigot end of the pipe, using only the lubricant supplied by the manufacturer. Be sure the entire circumference is covered. The coating should be the equivalent of a brush coat of enamel paint. It can be applied by hand, cloth, pad, sponge or glove. Do not lubricate the ring groove in the bell because such lubrication could cause ring displacement. The bevel end is then inserted into the bell so that it is in contact with the ring. Brace the bell, while the bevel end is pushed in under the ring, so that previously completed joints in the line will not be closed up. The spigot end is pushed until the reference mark on the spigot end is flush with the end of the bell. If undue resistance to inserting of the bevel end is encountered or the reference mark does not reach the flush position, disassemble the joint and check the position of the ring. If it is twisted or pushed out of its seat, clean the ring, bell and bevel end and repeat the assembly steps.

#### 4.09 PIPE JOINT INSTALLATION

- A. Dissimilar Materials

1. For piping systems which carry water or which are installed underground, wherever pipes of dissimilar metals are connected, an insulating section of rubber or plastic pipe shall be installed. The insulating section shall have a minimum length of 12 pipe diameters. Dielectric unions of an acceptable type may be used in lieu of the specified insulating sections. Wherever copper pipe is supported from hangers, it shall be insulated from the hangers with PVC tape.

B. Screwed Joints

1. Make up all threaded joints using a suitable joint lubricating compound applied to male threads only. Thoroughly ream all field cuts and carefully make all connections so that thread engagement will be secured.

C. Welded Joints

1. Weld and fabricate piping in accordance with ANSI Standard B31.1, latest edition, Code for Pressure Piping. Machine beveling in shop is preferred. Field beveling may be done by flame cutting to acceptable standards.
2. Align piping and equipment so that no part is offset more than 1/15". Set all fittings and joint square and true to preserve alignment during welding operation. Use of alignment rods inside pipe is prohibited.
3. Do not permit any weld to project within the pipe so as to restrict it. Tack welds, if used, must be of the same material and made by the procedure as the completed weld. Otherwise, remove tack welds during welding operation.
4. Do not split, bend, flatten or otherwise damage piping before, during or after installation.
5. Remove dirt, scale and other foreign matter from inside piping before tying in sections, fittings, valves or equipment.

D. Flanged Joints

1. Prior to installation of bolts, accurately center and align flanged joints to prevent mechanical pre-stressing of flanges, pipe and equipment. Align bolt holes to straddle the vertical, horizontal, or north-south center line.
2. Install proper gaskets, suitable for intended service and factory cut to proper dimensions. Secure with a suitable gasket cement.
3. Tighten bolts progressively to prevent unbalanced stress. Draw bolts tight to ensure proper seating of gaskets.
4. Take special care when attaching suction and discharge piping to jumping equipment to ensure that no stresses are transmitted or imposed on pump suction and discharge flanges by the connected piping. Install and permanently support all such piping to accurately match bolt holes and to provide uniform contact over entire installation of bolts in flanges. In addition, pump connection piping shall be free to move parallel to its longitudinal center line while bolts in pump connection flanges are tightened.

#### 4.10 WET CONNECTIONS

Schedules of existing fittings and proposed new fittings needed to make wet connections to existing waterlines as shown on the plans are estimates only. It is to be recognized that after existing lines and fittings are uncovered, that some discrepancies may occur. Where discrepancies occur, the CONTRACTOR shall request a decision by the OWNER as to how the connection in question shall be made. CONTRACTOR shall plan his work concerning wet connections in such a way that a minimum of inconvenience shall occur to existing water customers due to water service interruptions. Before water service interruptions are made to any customer, CONTRACTOR shall notify designated official and cooperate with operating personnel in every way to minimize service interruptions due to wet conditions. In certain locations, other utility lines or conduits will be obstructing the normal path of proposed waterlines. In such instances, gravity lines of all kinds hold priority as to grade over water pressure lines, gas lines, electric conduits, or other obstruction conduits or combinations of conduits which may be encountered. CONTRACTOR is to analyze conditions carefully and then use best judgment in determining proper method of proceeding through obstructed area with waterline construction, and shall notify the utility owner forty-eight (48) hours in advance of making such connection after obtaining approval from the Engineer.



4.11 OFFSET AND FITTINGS INSTALLATION

- A. Because of the small scale of drawings, the indication of all offsets and fittings is not possible. Carefully investigate the structural and finish conditions affecting the work and take such steps as may be required to meet such conditions.
- B. Provide proper space for covering and removal of pipe, and special clearances for offsets and fittings.
- C. All iron fittings shall be wrapped in a plastic protector in conformance with AWWA Standard C-105 and ANSI A21.5 "Polyethylene Encasement for Gray and Ductile Cast-Iron piping for Water and Other Liquids". Fitting wrapping shall be installed in such a manner as to curtail or prevent corrosion of the metallic fittings.

4.12 SECURING AND SUPPORTING

- A. General
  - 1. Support piping as required to maintain line and grade, with due provisions for expansion and contraction. Use approved hot-dipped galvanized hangers, rollers, anchors and guides properly connected to structural members. Do not support piping from other piping. Use non-metallic and stainless steel hangers where indicated on the plans.
- B. Hangers and Straps
  - 1. Place hangers not more than 6' apart on 1/2" and 3/4" pipes or 10' apart on larger pipes. Place hangers not more than 6' apart for all sizes of PVC pipe.
  - 2. Support vertical risers with hot-dipped galvanized steel strap pipe clamps properly supported at every floor unless otherwise shown on drawings.
  - 3. Perforated bar hangers, straps, wires or chains are not permitted.

C. Unistrut Pipe Supports

1. Provide standard Unistrap metal framing members and appurtenances for pipe support when applicable. Mult-A-Frame and Power-Strut pipe support systems also are acceptable. Hot-dip galvanize all such members and appurtenances.

D. Anchors

1. Provide anchors as indicated or required. Unless otherwise detailed on drawings, use pipe anchors consisting of heavy steel collars with lugs and bolts for clamping to pipe and attaching anchor braces. Install anchor braces in the most effective manner to secure desired results.
2. Do not install supports, anchors or similar devices where they will damage construction during installation or because of the weight or the expansion of the pipe.

E. Pipe Guides

1. For plant piping, provide pipe alignment guides as required by pipe manufacturer.
2. Guide expansion joints with two guides on the side opposite the anchor.

F. Substitution

1. In lieu of restrained joint pipe and fittings, Contractor may substitute mechanical or push-on joints with reaction anchorages and blocking as specified here and approved by Engineer. Provide all unlugged tees, Y-branches and bends deflecting  $22\frac{1}{2}^{\circ}$  or more which are installed in piping subjected to internal hydrostatic heads in excess of 15' in exposed or 30' in buried piping with suitable reaction blocking, struts, anchors, clamps, joint

harness or other adequate means to prevent movement of pipe caused by unbalanced internal liquid pressure or as indicated on drawings.

2. Trench Installation

Where in trench, provide fittings with concrete thrust blocking between fitting and solid undisturbed ground in each case except where solid ground blocking support is not available. At tops of slopes, anchor vertical angle bends by means of a mass of concrete of sufficient weight to resist hydraulic thrust at maximum pressures to which pipe will be subjected. Install concrete blocking and anchors so that all joints between pipe and fittings are accessible for repair. Bearing area of concrete reaction blocking against ground or trench bank shall be as shown on drawings or as directed by Engineer in each case. In event that adequate support against undisturbed ground cannot be obtained, install metal harness anchorages consisting of steel rods or bolts across joint and securely anchor to pipe and fitting or other adequate anchorage facilities approved by Engineer to provide necessary support. Should lack of a solid vertical excavation face be due to careless or otherwise improper trench excavation, entire cost of furnishing and installing metal harness anchorage in excess of contract value of concrete blocking replaced by such anchorages shall be borne by Contractor.

3. Locations other than trenches

Provide blocking, struts, anchorages or other supports for fittings installed in fills or other unstable reaction ground above grade or exposed within structures as required by drawings or as directed by Engineer

4. Protection of Metal Surfaces

Adequately protect all steel clamps, rods, bolts and other metal accessories used in reaction anchorages, or joint harness subject to submergence or contact with earth or fill material and not encased in concrete from corrosion with not less than two coats of either Koppers "Bitumastic No.50", or equal,

heavy coal-tar coating material applied to clean, dry metal surfaces. First coat shall be dry and hard before second coat is applied.

#### 4.13 PIPE SLEEVES

##### A. Sleeves

1. Wall pipes are required where shown on the plans and at all pipes penetrating water holding structures.
2. Fit with sleeves all pipes passing through masonry and concrete construction. Fabricate sleeves of hot dipped galvanized steel pipe unless otherwise indicated. Size sleeve for minimum clearance between pipe or insulation and sleeve.
3. Extend each sleeve through the floor or wall. Cut the sleeve flush with each surface, except that in exposed locations, extend floor sleeves 2" above finished floor line.
4. Caulk all sleeves watertight and airtight. Seal annular space between pipes and sleeves with a Thunderline Link-Seal or approved equal.

#### 4.14 CLEANING OF PIPING SYSTEMS

##### A. General

1. Clean piping systems thoroughly. Purge pipe of construction debris and

contamination before placing the systems in service. Use whatever temporary connections are required for cleaning, purging and circulating.

B. Strainer

1. For each system when specified in that system, install temporary strainers in front of pumps, tanks, water still, solenoid valves, control valves and other equipment where permanent strainers are not indicated. Keep these strainers in service until the equipment has been tested, then remove either entire strainer or straining element only. Fit strainers with a blow-off valve.

4.15 LEAK TESTS

- A. See Section 02513 – Pipe Testing & Clean Up.

END OF SECTION

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SECTION 33 10 00

SEPARATION DISTANCES

PART 1. GENERAL

1.01 SCOPE OF WORK

This section covers the requirements with respect to separation distances for water lines and sanitary sewers.

1.02 ADH RULES AND REGULATIONS

The ADH Rules and Regulations read as follows:

A. Sanitary and Safety Hazards

The operating routine shall include necessary protective measures to detect and remove or destroy any contaminant of concern or regulation that might enter the distribution system. Every precaution must be taken against the possibility of sewage contamination of the water in the distribution system. Water mains and sanitary sewers shall be constructed as far apart as practicable, and shall be separated by undisturbed and compacted earth. **A minimum horizontal distance of ten feet should be maintained between water lines and sewer lines or other sources of contamination.** Water lines and sewers shall not be laid in the same trench except on the written approval of the Arkansas Department of Health. Water mains necessarily in close proximity to sewers must be placed so that the bottom of the water line will be at least 18 inches above the top of the sewer line at its highest point. If this distance must unavoidably be reduced, the water line or the sewer line must be encased in watertight pipe with sealed watertight ends extending at least ten feet either side of the crossing. Any joint in the encasement pipe is to be mechanically restrained. The encasement pipe may be vented to the surface if carrying water or sewer under pressure. Where a water line must unavoidably pass beneath the sewer line, at least 18 inches of separation must be maintained between the outside of the two pipes in addition to the preceding encasement requirement. Exceptions to this must be approved in writing by the Arkansas Department of Health.

END OF SECTION

SECTION 33 20 00

STERILIZATION OF WATER MAINS

PART 1. GENERAL

1.01 DESCRIPTION OF WORK

- A. The work to be performed under this section of the Specifications shall consist of furnishing all labor, materials, and equipment necessary to sterilize water lines.
- B. Disinfection of the water lines shall be performed in accordance with AWWA-C651 – “Standard for Disinfection Water Mains” (Latest Edition).

1.02 STERILIZATION

- A. Prior to sterilizing, each valved section of the new pipeline shall be pressure tested and flushed with clean water from the existing system to remove all apparent evidence of dust, soil and fine debris which may have entered the line during construction and testing.
- B. Chlorine shall be used to sterilize the pipeline by the following method: The amount of chlorine applied shall be such as to provide a dosage of not less than fifty (50) parts per million. The chlorinating material shall be introduced to the water lines and distribution system in a manner approved by the Engineer. After a contact time of not less than twenty-four (24) hours, the free chlorine residual shall not be less than ten (10) parts per million. The system shall be flushed with clean water until the residual chlorine content is not greater than 0.2 parts per million. All valves in the lines being sterilized shall be opened and closed several times during the contact period.
- C. A minimum of two (2) samples shall be collected on consecutive days and submitted for analysis to a state certified bacteriological testing laboratory for each segment of water line installed. No water main shall be placed into service until satisfactory test reports have been received on two consecutive samples.
- D. Unless otherwise provided for in the Bid Schedule and Proposal, the cost of furnishing the chlorine, labor, tools, equipment, and test of chlorine content and bacteriological tests shall be at the expense of the Contractor.

END OF SECTION



**MINIMUM SPECIFIED TIME REQUIRED FOR A 1.0 PSIG PRESSURE DROP  
FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015**

1 Pipe Diameter (in.)	2 Minimum Time (min:sec)	3 Length for Minimum Time (ft)	4 Time for Longer Length (sec)	Specification Time for Length (L) Shown (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46
42	39:48	57	41.883 L	69:48	104:42	139:37	174:30	209:24	244:19	279:13	314:07
48	45:34	50	54.705 L	91:10	136:45	182:21	227:55	273:31	319:06	364:42	410:17
54	51:02	44	69.236 L	115:24	173:05	230:47	288:29	346:11	403:53	461:34	519:16
60	56:40	40	85.476 L	142:28	213:41	284:55	356:09	427:23	498:37	569:50	641:04

Note: If there has been no leakage (zero psig drop) after one hour of testing, the test section shall be accepted and the test complete.

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SECTION 33 30 00

PIPE TESTING AND CLEAN UP

PART 1. GENERAL

1.01 DESCRIPTION

- A. This section covers the testing of pipe materials, joints, or other materials incorporated into plant piping and leakage tests to determine watertightness.
- B. All pipelines and sewers shall be tested. Test pressure, duration, and media shall be as specified by the Engineer. Care should be exercised to isolate equipment not rated for the specified test pressure to avoid damage to the equipment.

PART 2. LEAKAGE TESTS

2.01 LEAKAGE TESTS OF GRAVITY LINES

The leakage test must be performed in the presence of a representative of the Engineer. The Contractor shall provide 24-hours minimum notice before beginning testing procedures. Leakage tests for watertightness of gravity sewer lines shall be completed in accordance with the following procedure:

- A. Air Testing: Prior to air testing the pipe shall be visually inspected to determine collapsed or crushed pipe. After visual inspection the section to be tested shall be cleaned and flushed. After flushing, all pipe outlets in the test section shall be plugged and each plug shall be suitably and securely braced.
  - 1. Air testing shall be performed per Uni-Bell PVC Pipe Association's, "Recommended Practice for Low Pressure Air Testing of Installed Sewer Pipe". The Contractor is to use the table at the end of the Section as a reference guide.
- B. Safety Provisions: Plugs used to close the sewer pipe for the air test must be securely braced to prevent the unintentional release of a plug which can become a high velocity projectile. Gauges, air piping manifolds, and valves shall be located at the top to enter a manhole where a plugged pipe is under pressure. Four pounds (gauge) air pressure develops a force against the plug in a 12" diameter pipe of approximately 450-pounds.

## 2.02 PRESSURE CONDUIT LEAKAGE TESTS

- A. Leakage tests for all piping specified to be "Water Tested" shall be made by filling the main with water and increasing the pressure to the testing pressure specified by the Engineer.

All pressure lines for this project shall be tested at not less than 1.25 times the stated sustained working pressure of the pipeline at the highest elevation along the test section and not less than 1.5 times the stated sustained working pressure of the pipeline at the lowest elevation along the test section. The duration of the leakage test shall be a minimum of 2-hours and shall be conducted in the presence of the Engineer or his project representative.

- B. All waterline shall be tested in accordance with AWWA C-600 or AWWA C-605 as applicable.
- C. Leakage of all exposed piping shall be zero throughout the duration of the test.
- D. The main shall not be accepted until the actual leakage is equal to or less than the allowable. In addition, all obvious leaks shall be repaired.
- E. The maximum leakage per hour for ductile iron, PVC, and concrete pipe shall be as calculated from the following formula:

Rubber gasket or O-ring joints (iron, PVC, and concrete)

$$Q = \frac{LD\sqrt{P}}{148,000}$$

Q = Allowable leakage (gallons per hour)

L = Length of pipe being tested (feet)

D = Nominal diameter (inches)

P = Test pressure (psi)

## 2.03 LEAKS ENCOUNTERED IN FINAL INSPECTION

- A. In addition to passing the above-described leakage tests, all obvious running leaks which may be observed in the final inspection shall be satisfactorily repaired.

## 2.04 CLEANING UP

- A. As the construction work progresses, the Contractor shall backfill the trenches, remove excess excavated materials and other debris and do sufficient cleanup and

blading of the trench surfaces to make the streets and alleys suitable for safe use of traffic.

After the construction work is completed and before final acceptance by the Owner, the Contractor shall remove all rubbish, excess materials, excess materials from excavations and other debris from the site of the work and all trench surfaces shall be bladed as heretofore specified. Adjacent road ditches and slopes which have been disturbed by this construction shall be restored to original shape density and condition. The cost of clean-up shall be included in the bid prices for the various units of work. After the cleanup has been completed, but before final acceptance by the Owner, the entire line must be tested to see that there are no obstructions in the line. Water for this testing shall be the responsibility of the Contractor. A rubber or plastic beach ball of same diameter as the pipe will be flushed through the line for this test.

2.05 LINE CLEANING

- A. All piping must be flushed to remove all mud and debris following construction. Materials flushed from the line shall not be allowed to enter the existing collection system.

2.06 DISINFECTION

- A. Following satisfactory completion of the acceptance test, all potable water lines shall be disinfected in accordance with Section 02512 of these Technical Specifications and AWWA C651.

END OF SECTION

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SECTION 33 40 00

SITE RESTORATION AND REHABILITATION

PART 1. GENERAL

1.01 SUMMARY

- A. Provide finish grading and grass establishment.
- B. The intention of this Specification is that the Contractor establishes turf on pipelines and areas damaged as a result of construction.

PART 2. MATERIALS

2.01 TOPSOIL

- A. Existing topsoil shall be reused where practical.
- B. Imported Topsoil:
  - 1. Furnish at sole expense of Contractor.
  - 2. Friable loam free from subsoil, roots, grass, excessive amounts of weeds, stone, and foreign matter; acidity range (pH) of 5.5 to 7.5; and containing a minimum of 4% and a maximum of 50% organic matter.

2.02 SEED

- A. Certified, blue tag, clean, delivered in original, unopened packages and bearing an analysis of the contents, guaranteed 95% pure and to have a minimum germination rate of 85%, within 1-year of test.

2.03 SEED MIX

- A. Mix for areas: Common Bermuda grass. Follow the recommendations of the local Agricultural Extension Agent for requirements on coverage, fertilization, and seasons.

PART 3. EXECUTION

3.01 SITE GRADING

- A. Shape, trim, and finish slopes to conform with lines, grades, and cross sections shown.
- B. Make slopes free of loose exposed roots and stones exceeding 3" diameter.
- C. Ensure that site drains properly and there are no areas where water may pond.
- D. Finished site grading will be reviewed by Engineer.

3.02 GRADING OF TOPSOIL

- A. Shape the topsoil over the area to the desired shape and contour.
- B. Apply commercial fertilizer at the Agricultural Extension Agent’s recommended rate, distributing it uniformly with a mechanical spreader.

3.03 FINISH GRADING

- A. Thoroughly mix the topsoil and fertilizer.
- B. Rake the area to a uniform grade so that areas drain in the same manner as at the start of the Project.
- C. Lightly compact before planting grass.
- D. Remove trash and stones exceeding 2” in diameter from area to a depth of 2” prior to preparation and planting grass.

3.04 TIME OF SEEDING

- A. Conduct seeding under favorable weather conditions during seasons, which are normal for work, as determined by accepted practice in locality of Project.

3.05 MECHANICAL SEEDING

- A. Sow grassed areas evenly with a mechanical spreader at rate of 100-lbs per acre, minimum, or as otherwise recommended by the Agricultural Extension Agent. Roll with cultipacker to cover seed, and water with fine spray. Method of seeding may be varied at discretion of Contractor on his own responsibility to establish a smooth, uniformly grassed area.

3.06 HYDROSEEDING

- A. Seed may be applied by hydroseeding method. Seeding shall be done within 10 days following soil preparation. Hydroseed areas at rate of 100-lbs seed and 500-lbs ammonium phosphate per acre, minimum, or as otherwise recommended by the Agricultural Extension Agent.
- B. Proceed with seeding operation on moist soil, but only after free surface water has drained away.
- C. Exercise care to prevent drift and displacement of mixture into other areas.

3.07 WINTER PROTECTIVE SEEDING



- A. Winter barley or annual rye grass applied at a rate of 120-lbs/acre shall be used after September 15 or as recommended by the Agricultural Extension Agent.
- B. Areas receiving temporary winter protective seeding shall be re-seeded when weather conditions become favorable.

3.08 MAINTENANCE

- A. Begin maintenance immediately after each portion of grass is planted and continue until a reasonable stand of grass has been obtained. Water to keep surface soil moist. Repair washed out areas by filling with topsoil, fertilizing, and seeding.

3.09 GUARANTEE

- A. If, at the end of a 180-day period, a satisfactory stand of grass has not been produced, the Contractor shall renovate and reseed the grass or unsatisfactory portions thereof immediately, or, if after the usual planting season, during the next planting season. If a satisfactory stand of grass develops by July 1 of the following year, it will be accepted. If it is not accepted, a complete replanting will be required during the planting season.
- B. A satisfactory stand is defined as grass or section of grass that has:
  - 1. No bare spots larger than 1 square foot.
  - 2. Not more than 10% of total area with bare spots larger than 1 square foot.
  - 3. Not more than 15% of total area with bare spots larger than 6" square.

END OF SECTION

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