

Project Manual for:

GORETOWN FIRE STATION ADDITIONS & RENOVATIONS

Loris, South Carolina

Horry County Government
Conway, South Carolina

Date: December 31, 2025

 **DOYLE**
ARCHITECTURE, LLC
315 Main Street, Suite 2B
Conway, SC 29526
(843) 455-6879

DA Project No.: 22-135

**SECTION 00 0101
PROJECT TITLE PAGE**



**INVITATION FOR BIDS
For
Additions & Renovations to:
GORETOWN FIRE STATION**

BID# 2025-26-056

Due: 2:00 p.m., March 31, 2026

The Following Applies to this solicitation:

- **Mandatory** Pre-Bid Meeting at 10:30am on March 11, 2026 at the Goretown Fire Station located at 365 Liberty Church Road, Loris, SC 29569.
- Last Day for Questions: March 19, 2026 at 2:00 PM
- Required Bid Forms Packet must be submitted with responses to this IFB.
- Bids shall remain firm for no less than Ninety (90) calendar days from the closing date.

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SECTION 00 2000
ADVERTISEMENT FOR BIDS

INVITATION FOR BID

Horry County Government is requesting solicitation bids for **BID# 2025-26-056 for the Addition and Renovations to the Goretown Fire Station.** Bids will be submitted via Horry County's electronic bid software **no later than 2:00 p.m., local time, March 31, 2026.** No fax, email, telephone, hand delivered, or text bid submittals will be accepted.

The solicitation document (IFB) can be obtained from the County's electronic bid software by visiting <https://www.bidnetdirect.com/south-carolina/horrycounty>.

Local Vendor Preference is applicable to this sealed bid process.

Electronic bid submittals must include the bidder's current (active) State of SC General Contractor's License.

Your firm is required to provide bid security in the amount of five percent (5%) of the base bid (excluding alternates and/or optional bid items).

Contact Information for this Project:

Ms. Angela Elliott

843-915-8404

All questions shall be submitted in the Horry County's e-bidding software.

Scope of Work:

Horry County Construction and Maintenance is seeking a qualified contractor to perform all Civil, Structural, Architectural, Fire Protection, Plumbing, Mechanical, and Electrical work as shown on the plans provided within the bid package for construction of the Addition and Renovations to Goretown Fire Station, located at 365 Liberty Church Road, Loris, SC 29569.

END OF SECTION 00 2000

SECTION 00 2113

INSTRUCTION TO BIDDERS – HORRY COUNTY

General

This solicitation will be conducted in accordance with Horry County Procurement Code and Regulation. This ordinance can be found in its entirety on the County's website at <https://www.horrycountysc.gov/media/ygbcfubd/codeandreg.pdf>.

Horry County hereby notifies all those responding to this IFB that, in accordance with the provisions of the Civil Rights Act of 1964 (Chapter 21, Title 42, of the U.S. Code) and Regulations promulgated in connection therewith, that it will affirmatively ensure that any contract entered into pursuant to this IFB, disadvantaged business enterprises will be afforded full and fair opportunity to make submittals in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

Funding

Goods and Services solicited in this IFB may be purchased with Grant and/or Federal Funds. In the event Federal Funding is available, Horry County requires compliance with all federal rules and regulations related to such funding.

Submitting a Bid

All bids shall be submitted electronically via Horry County's e-bidding software, <https://www.bidnetdirect.com/south-carolina/horrycounty>: **no later than the date and time specified on the cover page**. No e-mail, fax, hand-delivered, telephone, or text bid submittals will be accepted.

Pricing must be provided as indicated in the electronic bid software. If there is no charge for a specific item listed, bidders must enter \$0.00. Leaving item pricing blank indicates a "No Bid" for the item.

The bidder must include the required items listed in the [Required Bid Forms Packet](#) or their bid may be deemed non-responsive.

The County reserves the right to accept or reject any and all bids, in whole or in part, that are deemed to be in the best interest of the county at its sole discretion.

Examination of Bid Document

Prior to submitting a bid, each bidder shall carefully examine the Bidding documents, study and thoroughly familiarize himself with the specifications/requirements thereof and notify Owner of all conflicts, errors or discrepancies.

By submission of a bid, the bidder guarantees that all goods and services meet the requirements of the solicitation.

Bid proposals may be rejected if any omissions, alteration of form additions not called for, or any irregularities of any kind are shown. **The bid shall remain firm for no less than the specified number of calendar days from the date of bid submission as specified in the [Comments to the Project](#).** The

bidder's name and solicitation number shall be included when specifications or descriptive papers are submitted with the invitation for bid (IFB).

Drawings/Maps will be obtained in the e-bidding software unless otherwise specified.

The work under the resulting contract includes the furnishing of all labor, materials, equipment, and all items and services of every nature whether particularly mentioned or not that is required to complete the construction specified.

All work is to be done in accordance with drawings, specifications, and any permit conditions of federal, state, local, or any other agencies having jurisdiction.

Questions / Addendum

All questions must be submitted via Horry County's e-bidding software prior to the last day for questions as specified on the cover sheet for this IFB. Each question should be submitted individually within the "Q&A" section of the electronic bid software. All questions will be answered in the form of an addendum in the e-bidding software. If it becomes necessary to revise any part of this IFB, an addendum will be published. All amendments issued by Horry County must be acknowledged by the bidder. It shall be the Bidder's responsibility to ensure he has all addenda which have been issued by visiting Horry County's e-bidding software <https://www.bidnetdirect.com/south-carolina/horrycounty>

Potential and actual bidders are not permitted to contract Horry County employees outside of the Procurement Department during the procurement process. Potential and actual bidders are not permitted to contact any consultants contracted by the County to assist with efforts related, directly or indirectly, to the IFB process. Failure to comply with Horry County Procurement Regulation, Chapter 4, Contractor Requirements and Standards of Conduct for Horry County and Procurement Participants may result in the rejection of the bid and other penalties as applicable.

Mistakes in Bid

Corrections and withdrawal of the submitted offer will be permitted within the e-bidding software prior to Bid due date and time.

Bid Opening

Unofficial Bid Results will be made publicly available in the County's e-bidding software within an estimated time of 60 minutes after the established due date and time.

Licenses

All BIDDERS must be properly licensed to do business in the State of South Carolina and must comply with the Code of Laws of South Carolina, including Section 40-11- 200, when applicable. Your company does not need to be based in South Carolina, but must be licensed to do business in the state of SC and specifically Horry County, if awarded a contract. Failure to comply with this requirement may result in the rejection of the bid as non-responsive.

Bidder's Representation

By the act of submitting a bid for the proposed contract, the bidder represents that the bidder and all subcontractors the bidder intends to use have carefully and thoroughly reviewed the drawings, specifications and other construction contract documents and have found them complete and free from ambiguities and sufficient for the purpose intended. The bidder and all workmen, employees and

subcontractors the bidder intends to use are skilled and experienced in the type of construction represented by the construction contract documents bid upon. Neither the bidder nor any of the bidder's employees, agents, intended suppliers or subcontractors have relied upon any verbal representations, allegedly authorized or unauthorized from the owner, or the owner's employees or agents including architects, engineers or consultants, in assembling the bid figure. The bid figure is based solely upon the construction contract documents and properly issued written addenda and not upon any other written representation.

Bid Bond

Bid Bond is a guarantee that the successful bidder will enter into a contract with Horry County. The aforementioned guarantee, is to be retained by the Horry County as liquidated damages in the event the successful Bidder fails to enter into the contract as provided herein.

Each Bid must be accompanied by a Bid Bond made payable to Horry County in an amount of five percent (5%) of the Base Bid (excluding alternates and/or optional bid items). The Bid Bond Form and Powers of Attorney (POA) must be completed and submitted in Horry County's electronic bid software. Bid Bonds must be duly executed by the bidder as principle and issued by a surety authorized to conduct business in the State of South Carolina.

Any cost of the bonds should be included as the same as other necessary items not specifically quantified on the Bid Form.

Performance Bond

Performance Bond is a guarantee that the successful completion of the contract will be done in a satisfactory manner to Horry County. The aforementioned guarantee is to be retained by Horry County, in addition to any liquidated damages, in the event the successful Bidder fails to complete the contract as provided herein.

A performance bond in the amount of 100% of the contract price shall be required. The performance bond shall be delivered by the contractor to the County at the same time the contract is executed. If a contractor fails to deliver the required performance bond, the contractor's bid proposal shall be rejected, its bid proposal security shall be enforced. The bond shall be issued from a surety approved to operate in the State of South Carolina and shall have a "raised" seal. At no time during the contract will it be permissible for the performance bond to lapse.

Payment Bond

Payment Bond is a guarantee that the successful bidder will pay their subcontractors and material suppliers for the contracted project. The aforementioned guarantee is to be retained by Horry County, in the event that the successful bidder fails to administer all payments to subcontractors and material suppliers used for the completion of contract as provided herein.

A payment bond in the amount of 100% of the contract price shall be required. The payment bond shall be delivered by the contractor to the County at the same time the contract is executed. If a contractor fails to deliver the required payment bond, the contractor's bid proposal shall be rejected, its proposal security shall be enforced. The bond shall be issued from a surety approved to operate in the State of South Carolina and shall have a "raised" seal. At no time during the contract will it be permissible for the payment bond to lapse.

Liquidated Damages

Contractors shall complete 100% of the improvements within the number of calendar days specified within the [Comments to Project](#), (\$500.00 per day liquidated damages) from the Date of Commencement. If liquidated damages are not paid, the contractor agrees the County may deduct the amount of liquidated damages from any money due or that becomes due the contractor under this contract. All deductions from any money due to the contractor are considered to be liquidated damages and not a penalty.

Should the contractor fail to complete this contract and the work provided therein within the time fixed for such completion, the contractor shall become liable to the County for all loss and damage which the County may suffer on account thereof. It is agreed and understood that it will be difficult and impossible to ascertain and determine the actual damage which the County will sustain in the event of, and by reason of, such delay. It is therefore agreed that the contractor will pay to the County in liquidated damages of the dollar amount noted on the Comments to the Project of this document, per day for delays of completion by the contractor. If liquidated damages are not paid, the contractor agrees the County may deduct the amount of liquidated damages from any money due or that becomes due to the contractor under this contract. All deductions from any money due to the contractor are considered to be liquidated damages and not a penalty.

The contractor shall not be charged with resulting damage if:

- A. The delay in completion of the work arises from unforeseeable causes beyond the control and without the fault or negligence of the contractor, including, but not restricted to the act of God, acts of the public enemy, acts of the County, acts of another contractor in the performance of a contract with the County, fires, floods, epidemics, strikes, freight embargoes, delays of subcontractors or suppliers arising from unforeseeable causes beyond their control; and
- B. The contractor, within ten (10) days from the beginning of such delay, unless the County grants a further period of time before the date of final payment under the Special Instructions notifies the County in writing of the causes(s) of delay. The County shall ascertain the facts and the extent of the delay and extend the time for completing the work when, in his judgement, the findings of facts justify such an extension, and his findings of fact shall be final and conclusive on the parties.

The remedies provided for under this provision shall not be construed to limit, waive or otherwise abrogate any other remedy that the County shall be entitled to under other terms and conditions of this Contract. Failure of the County to enforce the liquidated damages provision of the contract shall not constitute a waiver of the breach of the contract for failure to perform in a timely manner. Any extension of time will be in the form of a [Change Order](#) duly authorized and signed by the appropriate County official, prior to contract completion date.

Payment Terms

Payment Terms are Net thirty (30) days upon receipt of correct invoice.

Unit Prices

Unit prices are requested for items in the bid. Each bidder shall include its pro-rate share of overhead, and other items necessary for completion of the project, per plans and specifications, not specifically listed in the schedule of values, so that the sum of the products obtained by multiplying the quantity

shown for each item by the unit price bid represents the Total Bid. Any bid not conforming to this requirement may be rejected as non-responsive. Additional instruction for Unit prices is found within the [Comments to Project](#).

If there is no charge for a specific item listed, bidders must enter \$0.00. Leaving item pricing blank indicates a "No Bid" for the item.

Sales Tax

When applicable, Horry County currently pays eight percent (8%) sales tax. The tax rate for the City of Myrtle Beach is nine percent (9%). The County is **NOT** sales tax exempt. ***Horry County is required to pay South Carolina Sales Tax. Sales Tax is expected to be include in the bidder's electronic bid submittal.***

Deviations

Any deviations from the scope of work indicated herein must be submitted in writing and clearly noted and explained in detail on a separate form and attached to the submitted bid. Otherwise it will be considered that items offered are in strict compliance with these specifications and successful bidder shall be held responsible thereto.

Written consent from the Director of Procurement must be submitted should any changes in specifications be made after the purchase order/contract has been awarded; otherwise, the responsibility for such changes shall be with the bidder. **Verbal information obtained otherwise will not be considered in awarding of bids.**

Horry County reserves the right to reject any or all bid proposals. It further reserves the right to waive technicalities and informalities in bids as well as to accept in whole or in part such bid or bids where it deems it advisable in protection of the best interest of the County of Horry, South Carolina. The County will be the sole judge as to whether bids submitted meet all requirements contained in this IFB.

Liability Coverage

The successful bidder shall provide proof of all required insurance(s), including workers' compensation, automobile liability, and general liability. Workers' Compensation shall include a minimum limit of \$100,000 per accident. Commercial General Liability coverage shall provide minimum limits of liability of \$2,000,000 per occurrence. This shall include coverage for premises/operations, products/completed operations, contractual liability, and independent contractors. A combination of an Umbrella/Excess policy limit and primary policy limit may be used to meet the Commercial General Liability policy limit required. Commercial Auto Liability shall include a minimum limit of \$1,000,000 combined single limit for bodily injury and property damage for vehicles used in premises/operations. Professional Liability insurance shall be provided with minimum liability limits of \$1,000,000 per occurrence (in addition to Commercial General Liability insurance) by professional services such as accountant, attorney, architect, design, engineering and most consultants that involve errors and omissions exposure protection. Horry County shall be named as an Additional Insured on all General Liability policies and expressed on the Certificate of Liability Insurance. Certificate Holder for Certificate of Insurance must be: Horry County, Attention: Risk Management, P.O. 997 Conway, SC 29528. Insurance shall indemnify County against any and all claims arising under or as a result of the performance of the contract resulting from this solicitation. The County must be provided written notice prior to cancellation, modification, or reduction in limits of any stipulated insurance. It is the responsibility of the vendor/contractor to ensure all subcontractors comply with all

insurance requirements of this solicitation and the resulting contract.

Contract Requirements Review Meeting(s)

The apparent low bidder and major sub-contractors may be required to attend a Contract Requirements Review Meeting(s) with the Procurement Director, and the Owners Representative. The General Contractor's designated Project Manager, Superintendent and Estimator shall be required to attend this meeting(s). The Project Manager, Superintendent, and Estimator for all Sub-Contractors must attend. Additional review meetings including technical (field) representatives from the major suppliers may also be required. The Sub-Contractor's Project Superintendent shall lead that portion of the meeting that addresses their particular trade.

Non-Collusion

By submitting a response, the party making the foregoing offer that such offer is genuine and not collusive or sham; that said Responder has not colluded, conspired, connived, or agreed, directly or indirectly with any responder or person, to put in a sham response, or that such other person shall refrain from offering and has not in any manner, directly or indirectly sought by agreement or collusion, or communication or conference, with any person to fix the submittal of affiant or any other responder or to fix any overhead, profit or cost element of said Response or of that of any other responder or to secure any advantage against owner any person interested in the proposed contract; and that all statements in said Response are true; and further, that such responder has not, directly or indirectly submitted this Quotation Request, or the contents thereof, or divulged information or data relative thereto to any association or to any member or agent thereof.
<https://www.horrycountysc.gov/media/ygbcfubd/codeandreg.pdf>.

Disaster/Emergency Clause

It is anticipated that services in the resultant contract may be necessary for emergency protective measures, disaster response, and disaster recovery. By submitting a response to this solicitation, the Proposer shall comply with all applicable federal laws, regulations, executive orders, FEMA policies, procedures, and directives, including but not limited to Appendix II to Part 200—Contract Provisions for Non-Federal Entity Contracts Under Federal Awards with the exception of Part (D) Davis Bacon Act. Invoices for services related to emergency protective measures, disaster response, and disaster recovery shall be separate from non-emergency/disaster service invoices.

Contract Award

Award of contract will be made to the lowest responsible and responsive bidder whose bid meets the requirements and criteria set forth in this IFB. In determining the lowest responsive and responsible bidder, the County will consider/evaluate the bidder's past and current performance of other County contracts and the bidder's existing workload, to include quality of work and timely completion of the performance schedule. The bidder must include all of the required forms in the required bid forms packet, signed and filled out correctly or their proposal may be deemed non-responsive. The County reserves the right to accept or reject any and all bids, in whole or in part, that are deemed to be in the best interest of the County at its sole discretion. The successful bidder agrees to enter into a contract with the County substantially similar to the attached "Sample Contract."

Term of Contract

The term of this contract shall be the amount of time specified within the [Comments to Project](#). The effective date of the contract shall be the date of the County's signature. The successful bidder will execute and abide by the contract referred to herein.

Non Appropriation of Funds

If (a) sufficient funds are not budgeted or appropriated and budgeted by Horry County Council in any fiscal period for payment of costs and fees and (b) Horry County has exhausted all funds legally available for such payment costs and fees due under this agreement or any renewal thereof, then Horry County will give awarded Provider reasonable written notice and this Agreement will terminate as of the last day of Horry County's fiscal period for which funds for payment are available. Such termination with notice is without any expense or penalty.

Local Vendor Preference

[Local Vendor Preference](#) affidavit and required documentation **MUST be submitted WITH a vendor's SEALED BID** to be considered, per Horry County Council Resolution # 116- 13. Please see attached documentation.

Grievance / Bid Protest

Any actual or prospective responder, bidder, offeror, or awardee of a contractor agreement who aggrieved in connection with the solicitation or award of a contract may protest to the County Administrator. The protest shall be submitted in writing within fourteen (14) days after such aggrieved person knows or should have known of the facts giving rise thereto provided that grievance has been made in accordance with solicitation requirements. Any grievance filed shall be made known prior to any bid opening in accordance with invitation to bids. *Please reference **Subchapter 15-3- Bid Protests of the Horry County Code & Regulation** by visiting:*

<https://www.horrycountysc.gov/media/ygbcfubd/codeandreg.pdf>.

Contract Changes

Contract terms and conditions shall not be changed unless by Change Order. Change must be deemed allowable, allocable, within the scope of its grant or cooperative agreement, and reasonable for the completion of project scope. Changes shall be agreed upon by both parties and recorded using the approved change order document. The change to method, price, or schedule of the work must be clearly identified for each specific change which may occur. Additional process information available within Horry County Procurement Regulation Subchapter 13-3: Post Award Issues.

This procurement (IFB) does not commit the County of Horry to award a contract, to pay any costs incurred in the preparation of the bid proposal, or to procure or contract for goods or services listed herein.

Freedom of Information Statement

Procurement information shall be a public record to the extent required by Chapter 4 of Title 30, Code of Laws of South Carolina (1976, as amended) (The Freedom of Information Act), with the exception that commercial or financial information obtained in response to a "Invitation for Bids" which is privileged and confidential if so designated by the proposer shall be protected from disclosure. Such information must be clearly marked as "CONFIDENTIAL" by those submitting responses for each section of information so affected. Privileged and confidential information is information in specific detail not customarily released to the general public, the release of which might cause harm to the competitive position of the party supplying the information.

Title VI

The contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national

origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.

Legal Statement

Disclose any litigation within the last five (5) years in which a claim has been made against any team member (individual or company) asserting a cause of action other than Employment issues or Contracts not related to your professional work. Explain the issues in these cases (or the fact there are none) as part of your submittal.

Remainder of this page intentionally left blank.

COMMENTS TO THE PROJECT

Horry County intends to make the improvements at the location shown on the plans. The Contractor is to include in his/her bid all work necessary to complete the listed items and other work reasonably intended and/or is shown on the plans.

The Contractor should consider the following information in making his bid:

- **Mandatory** site visit: **MARCH 11, 2026 at 10:30am**. Location: Goretown Fire Station; 365 Liberty Church Road, Loris, SC 29569
- Last day for questions: **MARCH 19, 2026** at 2:00 PM
- Bids are due: 2:00 p.m., **MARCH 31, 2026** electronically
- Bid to be held firm for ninety (90) calendar days
- Period of performance is two hundred seventy (270) calendar days, measured from the Date of Commencement to the Date of Substantial Completion.
- Liquidated Damages five hundred (500) dollars a day beyond 270 days from Date of Commencement to Substantial Completion.
- Local Vendor Preference (LVP) is applicable to this project

END OF SECTION 00 2113

SECTION 00 3000
REQUIRED BID FORMS

Separate downloadable file in BidNet

See Required Bid Forms Packet pdf

END OF SECTION 00 3000

 AIA® Document A701® – 2018

Instructions to Bidders

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

HC Goretown Fire Station Addition & Renovations
365 Liberty Church Road
Loris, South Carolina 29569

Addition and renovations to convert a volunteer fire station to a staffed station.

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

Horry County Government
103 Elm Street
Conway, South Carolina 29526

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

Doyle Architecture, LLC
315 Main Street, Suite 2B
Conway, South Carolina 29526

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. Alternate prices, if required, are listed in Section 01 2300 of the Project Manual entitled 'Alternates'.

§ 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; Failure to do so will be at the Bidder's risk and he cannot attain release of responsibility on the plea of an error in his bid;
- .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.)

Bid Documents may be obtained from the County's electronic bid software by visiting:

§ 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 fifteen 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 Owner 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 Owner at least ten 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.)

Requests for clarification and interpretation may only be submitted through the County's electronic bid software by visiting: <https://bidnetdirect.com/south-carolina/horrycounty>.

§ 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 No substitution to that specified or called for on the Drawings will be considered unless request for approval is submitted NOT LESS THAN TEN (10) CALENDAR DAYS PRIOR TO THE BID DATE and approval of same issued to all Bidders of Record by Addendum not later than five (5) calendar days prior to the Bid Date. Each request shall contain the following:

- a. Name of project and location
- b. Name of material or equipment to be submitted
- c. Performance and test data
- d. **Any and all** other detailed specification information required for an evaluation
- e. Specified location of item in the Contract Documents
- f. Complete list designating any changes in related materials, equipment, and/or works that inclusion of substitute would necessitate
- g. Line-by-line difference comparisons between specified item and item submitted for approval
- h. Drawings, if needed
- i. Samples, when applicable

§ 3.3.2.2 NO REQUEST WILL BE CONSIDERED UNLESS ALL RELATED INFORMATION AS DESCRIBED ABOVE IS SUBMITTED.

§ 3.3.2.3 The Architect's decision of approval or disapproval of the request shall be final. The successful bidder shall be responsible for using only materials, equipment, and/or work as stipulated in the Project Manual or as published as an approved substitution.

§ 3.3.3 Not used.

§ 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.)

Addenda shall be distributed by the Owner to all parties who register and download the Bid Documents per Article 3.1.1.

§ 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.

§ 4.1.9 Any item listed in Paragraphs 4.1.4, 4.1.5, and 4.1.7 or irregularity of any kind shall be considered reason for rejection of Bid by the Owner.

§ 4.2 Bid Security

§ 4.2.1

(Paragraphs deleted)

A Bid Security will be required for this Project in accordance with Section 00 2000 – Advertisement for Bids.

(Paragraphs deleted)

§ 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.)

All bids shall be submitted electronically via Horry County's e-bidding software:

<https://www.bidnetdirect.com/south-carolina/horrycounty>

§ 4.3.2 Not Used.

§ 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 Owner 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 Owner, 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.)

If a Bid is withdrawn as described above, the Bid Security will be returned in full to the Bidder.

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 recorded and a summary of the Bids may be made available to Bidders in Horry County's electronic bidding software, Bidnet, within sixty (60) minutes of bid opening.

§ 5.2 Rejection of Bids

Unless otherwise prohibited by law, the Owner shall have the right to reject any or all Bids.

§ 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 when such waiver is in the best interest of the Owner and to award the project in the best interest of the Owner.

§ 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.

§ 6.2 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.

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

§ 7.1.5 The successful Contractor shall be required to furnish a Performance Bond in the amount of the contract sum. The bond shall be issued on Document A312, current edition, published by the American Institute of Architects, and shall be written by a surety company licensed in South Carolina, with an "A" minimum rating of performance as stated in the most current publication of "Best's Key Rating Guide, Property Liability", which shall show a financial strength of at least five times the contract price. Each bond shall be accompanied by a "Power of Attorney" authorizing the attorney-in-fact to bind the surety and certified to include the date of the bond.

§ 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.

(Paragraphs deleted)

- .2 Not Used.

- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction, unless otherwise stated below.

(Paragraphs deleted)

- .4 Not Used.

- .5 Drawings

Number	Title	Date
G-001	Cover Sheet & Code Summary	Dec 31, 2025
G-002	Life Safety Plan & Misc Code Requirements	Dec 31, 2025
--	Survey	Dec 31, 2025
AD-101	Demolition Plan & Elevations	Dec 31, 2025
C-1	Civil Cover	Dec 31, 2025
C-2	Civil Legend	Dec 31, 2025
C-3	Civil Notes	Dec 31, 2025
C-4	Removals & SESC Plan	Dec 31, 2025
C-5	Site Plan	Dec 31, 2025
C-6	Utility Plan	Dec 31, 2025
C-7	Grading & Drainage Plan	Dec 31, 2025
C-8	Landscape Plan	Dec 31, 2025
C-9	Civil Details	Dec 31, 2025
C-10	ESC Details	Dec 31, 2025
C-11	SCDOT Details	Dec 31, 2025
C-12	GSWSA Details	Dec 31, 2025

C-13	Septic Details	Dec 31, 2025
C-14	SCDOT Exhibit	Dec 31, 2025
A-101	Ground Floor Plan & Wall Types	Dec 31, 2025
A-102	Reflected Ceiling Plan	Dec 31, 2025
A-103	Roof Plan & Details	Dec 31, 2025
A-104	Finish, Furniture & & Equipment Plan / Schedules	Dec 31, 2025
A-201	Exterior Building Elevations	Dec 31, 2025
A-202	Exterior Building Elevations, Dumpster Plan/Elevation/Details	Dec 31, 2025
A-203	Building Sections	Dec 31, 2025
A-301	Wall Sections	Dec 31, 2025
A-302	Wall Sections	Dec 31, 2025
A-303	Wall Sections	Dec 31, 2025
A-304	Wall Sections	Dec 31, 2025
A-305	Wall Sections	Dec 31, 2025
A-306	Wall Sections	Dec 31, 2025
A-401	Exterior Details	Dec 31, 2025
A-501	Door Schedule, Types, & Details	Dec 31, 2025
A-502	Window Schedule, Types, & Details	Dec 31, 2025
A-701	Enlarged Toilet Room Plans/Elevations; Locker Room Elevs & FRP Details	Dec 31, 2025
A-702	Kitchen & Vestibule Elevations	Dec 31, 2025
A-801	Enlarged Cabinet Details	Dec 31, 2025
S1.0	Foundation Plan	Dec 31, 2025
S1.1	Framing Plan	Dec 31, 2025
S2.0	Wall Sections	Dec 31, 2025
S2.1	Wall Sections	Dec 31, 2025
S2.2	Wall Sections	Dec 31, 2025
S2.3	Wall Sections	Dec 31, 2025
S2.4	Schedules & Typical Section Details	Dec 31, 2025
S3.0	Structural General Notes	Dec 31, 2025
P100	Plumbing Schedules, Notes, & Details	Dec 31, 2025
P200	Plumbing Demo Plan	Dec 31, 2025
P201	Plumbing - Waste Plan	Dec 31, 2025
P202	Plumbing - Water Plan	Dec 31, 2025
P203	Plumbing - Gas Plan	Dec 31, 2025
P204	Plumbing - Riser	Dec 31, 2025
M100	Mechanical Schedules, Notes, & Details	Dec 31, 2025
M200	Mechanical Demo Plan	Dec 31, 2025
M201	Mechanical Plan	Dec 31, 2025
E100	Electrical Schedules, Notes, & Details	Dec 31, 2025
E101	Electrical Schedules, Notes, & Details	Dec 31, 2025
E200	Electrical Demo Plan	Dec 31, 2025
E201	Electrical Power Plan	Dec 31, 2025
E202	Electrical Lighting Plan	Dec 31, 2025
E300	Electrical Site Plan	Dec 31, 2025
FA100	Fire Alarm Plan	Dec 31, 2025

.6 Specifications

Section	Title	Date	Pages
00 0101	Project Title Page	Dec 31, 2025	1

00 0110	Table of Contents	Dec 31, 2025	4
00 0115	List of Drawing Sheets	Dec 31, 2025	3
00 2000	Advertisement for Bids	Dec 31, 2025	1
00 2113	Instructions to Bidders – Horry County	Dec 31, 2025	9
00 3000	Required Bid Forms	Dec 31, 2025	1
00 5150	Instructions to Bidders – AIA A701	Dec 31, 2025	11
00 5200	Contract Forms	Dec 31, 2025	19
00 7200	General Conditions – AIA A201	Dec 31, 2025	39
00 7250	Supplementary Conditions	Dec 31, 2025	10
01 1000	Summary	Dec 31, 2025	1
01 2100	Allowances	Dec 31, 2025	1
01 3000	Administrative Requirements	Dec 31, 2025	5
01 4000	Quality Requirements	Dec 31, 2025	2
01 4100	Regulatory Requirements	Dec 31, 2025	1
01 5000	Temporary Facilities & Controls	Dec 31, 2025	2
01 6000	Product Requirements	Dec 31, 2025	3
01 7000	Execution & Closeout Requirements	Dec 31, 2025	7
01 7800	Closeout Submittals	Dec 31, 2025	3
02 4100	Demolition	Dec 31, 2025	3
03 1000	Concrete Forming and Accessories	Dec 31, 2025	6
03 2000	Concrete Reinforcing	Dec 31, 2025	4
03 3000	Cast-in-Place Concrete	Dec 31, 2025	20
04 2000	Unit Masonry	Dec 31, 2025	4
04 2613	Masonry Veneer	Dec 31, 2025	6
05 3100	Steel Decking	Dec 31, 2025	7
06 1000	Rough Carpentry	Dec 31, 2025	3
06 1600	Sheathing	Dec 31, 2025	6
06 1753	Shop-Fabricated Wood Trusses	Dec 31, 2025	7
06 1800	Glue-Laminated Construction	Dec 31, 2025	6
06 4100	Architectural Wood Casework	Dec 31, 2025	3
06 8316	Fiberglass Reinforced Paneling	Dec 31, 2025	2
07 0553	Fire & Smoke Assembly Identification	Dec 31, 2025	1
07 1113	Bituminous Dampproofing	Dec 31, 2025	3
07 2100	Thermal Insulation	Dec 31, 2025	2
07 2500	Weather Barriers	Dec 31, 2025	3
07 4113	Metal Roof Panels	Dec 31, 2025	4
07 4646	Fiber-Cement Siding	Dec 31, 2025	2
07 5400	Thermoplastic Membrane Roofing	Dec 31, 2025	4
07 6200	Sheet Metal Flashing & Trim	Dec 31, 2025	3
07 7123	Manufactured Gutters & Downspouts	Dec 31, 2025	2
07 8400	Firestopping	Dec 31, 2025	2
07 9200	Joint Sealants	Dec 31, 2025	3
08 1113	Hollow Metal Doors & Frames	Dec 31, 2025	5
08 1416	Flush Wood Doors	Dec 31, 2025	4
08 3100	Access Doors and Panels	Dec 31, 2025	1
08 3613	Sectional Doors	Dec 31, 2025	4
08 4413	Glazed Aluminum Curtain Walls	Dec 31, 2025	5
08 5113	Aluminum Windows	Dec 31, 2025	5
08 7100	Door Hardware	Dec 31, 2025	19

08 8000	Glazing	Dec 31, 2025	6
08 9100	Louvers	Dec 31, 2025	3
09 2116	Gypsum Board Assemblies	Dec 31, 2025	4
09 5100	Acoustical Ceilings	Dec 31, 2025	3
09 6500	Resilient Flooring	Dec 31, 2025	2
09 6700	Fluid-Applied Flooring	Dec 31, 2025	2
09 9113	Exterior Painting	Dec 31, 2025	4
09 9123	Interior Painting	Dec 31, 2025	5
09 9300	Staining & Transparent Finishing	Dec 31, 2025	3
10 1419	Dimensional Letter Signage	Dec 31, 2025	2
10 2800	Toilet, Bath, and Laundry Accessories	Dec 31, 2025	3
10 4400	Fire Protection Specialties	Dec 31, 2025	2
10 5113	Metal Lockers	Dec 31, 2025	2
10 5613	Metal Storage Shelving	Dec 31, 2025	3
10 7500	Flagpoles	Dec 31, 2025	2
11 3013	Residential Appliances	Dec 31, 2025	2
12 3600	Countertops	Dec 31, 2025	3
21 0000	Automatic Sprinkler Fire Protection	Dec 31, 2025	3
22 0501	Common Plumbing Requirements	Dec 31, 2025	6
22 0529	Hangers & Supports for Plumbing	Dec 31, 2025	3
22 0548	Vibration/Seismic Controls for Plumbing Piping/Equip.	Dec 31, 2025	4
22 0553	Identification for Plumbing Pipes & Equipment	Dec 31, 2025	2
22 0719	Plumbing Piping Insulation	Dec 31, 2025	3
22 1116	Domestic Water Piping	Dec 31, 2025	2
22 1119	Domestic Water Piping Specialties	Dec 31, 2025	2
22 1313	Facility Sanitary Sewers	Dec 31, 2025	3
22 1319	Facility Sanitary Sewer Specialties	Dec 31, 2025	1
22 3423	Gas Domestic Water Heaters	Dec 31, 2025	2
22 4213	Commercial Water Closets & Urinals	Dec 31, 2025	2
22 4216	Commercial Lavatories & Sinks	Dec 31, 2025	2
23 0501	Common HVAC Requirements	Dec 31, 2025	7
23 0529	Hangers & Supports for HVAC Piping & Equipment	Dec 31, 2025	3
23 0548	Vibration/Seismic Controls for HVAC Piping/Equip.	Dec 31, 2025	4
23 0713	Duct Insulation	Dec 31, 2025	2
23 0719	HVAC Piping Insulation	Dec 31, 2025	3
23 1123	Facility Natural Gas Piping	Dec 31, 2025	3
23 2300	Refrigerant Piping	Dec 31, 2025	5
23 2600	Condensate Drain Piping	Dec 31, 2025	1
23 3114	Low Pressure Metal Ducts	Dec 31, 2025	2
23 3346	Flexible Ducts	Dec 31, 2025	2
23 3400	HVAC Fans	Dec 31, 2025	2
23 3713	Diffusers, Registers, & Grilles	Dec 31, 2025	1
23 6213	Air-Cooled Refrigerant Compressor/Condenser Units	Dec 31, 2025	4
26 0501	Common Electrical Requirements	Dec 31, 2025	3
26 0503.1	Electrical Utility Services	Dec 31, 2025	1
26 0519	Line Voltage Electrical Power Conductors & Cables	Dec 31, 2025	2
26 0526	Grounding & Bonding for Electrical Systems	Dec 31, 2025	2
26 0533	Raceway & Boxes for Electrical Systems	Dec 31, 2025	3
26 2417	Circuit Breaker Panelboards	Dec 31, 2025	2

26 2726	Wiring Devices	Dec 31, 2025	2
26 2816	Enclosed Switches & Circuit Breakers	Dec 31, 2025	1
26 2900	Generator	Dec 31, 2025	7
26 2901	Automatic Transfer Switch	Dec 31, 2025	5
26 5100	Interior Lighting	Dec 31, 2025	2
26 5600	Exterior Lighting	Dec 31, 2025	2
28 3101	Fire Detection & Alarm	Dec 31, 2025	5

(Paragraphs deleted)

Additions and Deletions Report for

AIA® Document A701® – 2018

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 21:11:26 ET on 02/22/2026.

PAGE 1

HC Goretown Fire Station Addition & Renovations
365 Liberty Church Road
Loris, South Carolina 29569

...

Addition and renovations to convert a volunteer fire station to a staffed station.

...

Horry County Government
103 Elm Street
Conway, South Carolina 29526

...

Doyle Architecture, LLC
315 Main Street, Suite 2B
Conway, South Carolina 29526

PAGE 2

§ 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. Alternate prices, if required, are listed in Section 01 2300 of the Project Manual entitled 'Alternates'.

...

- .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; Failure to do so will be at the Bidder's risk and he cannot attain release of responsibility on the plea of an error in his bid;

...

Bid Documents may be obtained from the County's electronic bid software by visiting:
<https://www.bidnetdirect.com/south-carolina/horrycounty>

§ 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~~ fifteen 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.

PAGE 3

§ 3.2.1 The Bidder shall carefully study the Bidding Documents, shall examine the site and local conditions, and shall notify the ~~Architect-Owner~~ 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-Owner~~ at least ~~seven-ten~~ days prior to the date for receipt of Bids.

...

Requests for clarification and interpretation may only be submitted through the County's electronic bid software by visiting: <https://bidnetdirect.com/south-carolina/horrycounty>.

...

§ 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. No substitution to that specified or called for on the Drawings will be considered unless request for approval is submitted NOT LESS THAN TEN (10) CALENDAR DAYS PRIOR TO THE BID DATE and approval of same issued to all Bidders of Record by Addendum not later than five (5) calendar days prior to the Bid Date. Each request shall contain the following:~~

- a. Name of project and location
- b. Name of material or equipment to be submitted
- c. Performance and test data
- d. Any and all other detailed specification information required for an evaluation
- e. Specified location of item in the Contract Documents
- f. Complete list designating any changes in related materials, equipment, and/or works that inclusion of substitute would necessitate
- g. Line-by-line difference comparisons between specified item and item submitted for approval
- h. Drawings, if needed
- i. Samples, when applicable

§ 3.3.2.2 ~~Bidders shall submit substitution requests on a Substitution Request Form if one is provided in the Bidding Documents. NO REQUEST WILL BE CONSIDERED UNLESS ALL RELATED INFORMATION AS DESCRIBED ABOVE IS SUBMITTED.~~

§ 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. The Architect's decision of approval or disapproval of the request shall be final. The successful bidder shall be responsible for using only materials, equipment, and/or work as stipulated in the Project Manual or as published as an approved 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. Not used.~~

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Addenda shall be distributed by the Owner to all parties who register and download the Bid Documents per Article 3.1.1.

...

§ 4.1.9 Any item listed in Paragraphs 4.1.4, 4.1.5, and 4.1.7 or irregularity of any kind shall be considered reason for rejection of Bid by the Owner.

§ 4.2.1 Each Bid shall be accompanied by the following bid security:
(Insert the form and amount of bid security.)

A Bid Security will be required for this Project in accordance with Section 00 2000 – Advertisement for Bids.

§ 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 days after the opening of Bids, withdraw its Bid and request the return of its bid security.

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All bids shall be submitted electronically via Horry County's e-bidding software:
<https://www.bidnetdirect.com/south-carolina/horrycounty>

§ 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. 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.~~Not Used.~~

...

§ 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~~ Owner 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~~ Owner, 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:

...

If a Bid is withdrawn as described above, the Bid Security will be returned in full to the Bidder.

...

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 recorded and a summary of the Bids may be made available to Bidders. Bidders in Horry County's electronic bidding software, Bidnet, within sixty (60) minutes of bid opening.

...

§ 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.~~ when such waiver is in the best interest of the Owner and to award the project in the best interest of the Owner.

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~~(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.)~~

§ 7.1.5 The successful Contractor shall be required to furnish a Performance Bond in the amount of the contract sum. The bond shall be issued on Document A312, current edition, published by the American Institute of Architects, and shall be written by a surety company licensed in South Carolina, with an "A" minimum rating of performance as stated in the most current publication of "Best's Key Rating Guide, Property Liability", which shall show a financial strength of at least five times the contract price. Each bond shall be accompanied by a "Power of Attorney" authorizing the attorney-in-fact to bind the surety and certified to include the date of the bond.

...

(Insert the complete AIA Document number, including year, and Document title.)

~~.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.)~~

.2 Not Used.

...

(Insert the complete AIA Document number, including year, and Document title.)

~~.4 Building Information Modeling Exhibit, if completed:~~

.4 Not Used.

...

<u>G-001</u>	<u>Cover Sheet & Code Summary</u>	<u>Dec 31, 2025</u>
<u>G-002</u>	<u>Life Safety Plan & Misc Code Requirements</u>	<u>Dec 31, 2025</u>
<u>--</u>	<u>Survey</u>	<u>Dec 31, 2025</u>
<u>AD-101</u>	<u>Demolition Plan & Elevations</u>	<u>Dec 31, 2025</u>
<u>C-1</u>	<u>Civil Cover</u>	<u>Dec 31, 2025</u>
<u>C-2</u>	<u>Civil Legend</u>	<u>Dec 31, 2025</u>
<u>C-3</u>	<u>Civil Notes</u>	<u>Dec 31, 2025</u>
<u>C-4</u>	<u>Removals & SESC Plan</u>	<u>Dec 31, 2025</u>
<u>C-5</u>	<u>Site Plan</u>	<u>Dec 31, 2025</u>
<u>C-6</u>	<u>Utility Plan</u>	<u>Dec 31, 2025</u>
<u>C-7</u>	<u>Grading & Drainage Plan</u>	<u>Dec 31, 2025</u>
<u>C-8</u>	<u>Landscape Plan</u>	<u>Dec 31, 2025</u>
<u>C-9</u>	<u>Civil Details</u>	<u>Dec 31, 2025</u>
<u>C-10</u>	<u>ESC Details</u>	<u>Dec 31, 2025</u>
<u>C-11</u>	<u>SCDOT Details</u>	<u>Dec 31, 2025</u>
<u>C-12</u>	<u>GWSA Details</u>	<u>Dec 31, 2025</u>

<u>C-13</u>	<u>Septic Details</u>	<u>Dec 31, 2025</u>
<u>C-14</u>	<u>SCDOT Exhibit</u>	<u>Dec 31, 2025</u>
<u>A-101</u>	<u>Ground Floor Plan & Wall Types</u>	<u>Dec 31, 2025</u>
<u>A-102</u>	<u>Reflected Ceiling Plan</u>	<u>Dec 31, 2025</u>
<u>A-103</u>	<u>Roof Plan & Details</u>	<u>Dec 31, 2025</u>
<u>A-104</u>	<u>Finish, Furniture & & Equipment Plan / Schedules</u>	<u>Dec 31, 2025</u>
<u>A-201</u>	<u>Exterior Building Elevations</u>	<u>Dec 31, 2025</u>
<u>A-202</u>	<u>Exterior Building Elevations, Dumpster Plan/Elevation/Details</u>	<u>Dec 31, 2025</u>
<u>A-203</u>	<u>Building Sections</u>	<u>Dec 31, 2025</u>
<u>A-301</u>	<u>Wall Sections</u>	<u>Dec 31, 2025</u>
<u>A-302</u>	<u>Wall Sections</u>	<u>Dec 31, 2025</u>
<u>A-303</u>	<u>Wall Sections</u>	<u>Dec 31, 2025</u>
<u>A-304</u>	<u>Wall Sections</u>	<u>Dec 31, 2025</u>
<u>A-305</u>	<u>Wall Sections</u>	<u>Dec 31, 2025</u>
<u>A-306</u>	<u>Wall Sections</u>	<u>Dec 31, 2025</u>
<u>A-401</u>	<u>Exterior Details</u>	<u>Dec 31, 2025</u>
<u>A-501</u>	<u>Door Schedule, Types, & Details</u>	<u>Dec 31, 2025</u>
<u>A-502</u>	<u>Window Schedule, Types, & Details</u>	<u>Dec 31, 2025</u>
<u>A-701</u>	<u>Enlarged Toilet Room Plans/Elevations; Locker Room Elevs & FRP Details</u>	<u>Dec 31, 2025</u>
<u>A-702</u>	<u>Kitchen & Vestibule Elevations</u>	<u>Dec 31, 2025</u>
<u>A-801</u>	<u>Enlarged Cabinet Details</u>	<u>Dec 31, 2025</u>
<u>S1.0</u>	<u>Foundation Plan</u>	<u>Dec 31, 2025</u>
<u>S1.1</u>	<u>Framing Plan</u>	<u>Dec 31, 2025</u>
<u>S2.0</u>	<u>Wall Sections</u>	<u>Dec 31, 2025</u>
<u>S2.1</u>	<u>Wall Sections</u>	<u>Dec 31, 2025</u>
<u>S2.2</u>	<u>Wall Sections</u>	<u>Dec 31, 2025</u>
<u>S2.3</u>	<u>Wall Sections</u>	<u>Dec 31, 2025</u>
<u>S2.4</u>	<u>Schedules & Typical Section Details</u>	<u>Dec 31, 2025</u>
<u>S3.0</u>	<u>Structural General Notes</u>	<u>Dec 31, 2025</u>
<u>P100</u>	<u>Plumbing Schedules, Notes, & Details</u>	<u>Dec 31, 2025</u>
<u>P200</u>	<u>Plumbing Demo Plan</u>	<u>Dec 31, 2025</u>
<u>P201</u>	<u>Plumbing - Waste Plan</u>	<u>Dec 31, 2025</u>
<u>P202</u>	<u>Plumbing – Water Plan</u>	<u>Dec 31, 2025</u>
<u>P203</u>	<u>Plumbing – Gas Plan</u>	<u>Dec 31, 2025</u>
<u>P204</u>	<u>Plumbing – Riser</u>	<u>Dec 31, 2025</u>
<u>M100</u>	<u>Mechanical Schedules, Notes, & Details</u>	<u>Dec 31, 2025</u>
<u>M200</u>	<u>Mechanical Demo Plan</u>	<u>Dec 31, 2025</u>
<u>M201</u>	<u>Mechanical Plan</u>	<u>Dec 31, 2025</u>
<u>E100</u>	<u>Electrical Schedules, Notes, & Details</u>	<u>Dec 31, 2025</u>
<u>E101</u>	<u>Electrical Schedules, Notes, & Details</u>	<u>Dec 31, 2025</u>
<u>E200</u>	<u>Electrical Demo Plan</u>	<u>Dec 31, 2025</u>
<u>E201</u>	<u>Electrical Power Plan</u>	<u>Dec 31, 2025</u>
<u>E202</u>	<u>Electrical Lighting Plan</u>	<u>Dec 31, 2025</u>
<u>E300</u>	<u>Electrical Site Plan</u>	<u>Dec 31, 2025</u>
<u>FA100</u>	<u>Fire Alarm Plan</u>	<u>Dec 31, 2025</u>
<u>00 0101</u>	<u>Project Title Page</u>	<u>Dec 31, 2025</u> <u>1</u>
<u>00 0110</u>	<u>Table of Contents</u>	<u>Dec 31, 2025</u> <u>4</u>
<u>00 0115</u>	<u>List of Drawing Sheets</u>	<u>Dec 31, 2025</u> <u>3</u>

00 2000	<u>Advertisement for Bids</u>	<u>Dec 31, 2025</u>	<u>1</u>
00 2113	<u>Instructions to Bidders – Horry County</u>	<u>Dec 31, 2025</u>	<u>9</u>
00 3000	<u>Required Bid Forms</u>	<u>Dec 31, 2025</u>	<u>1</u>
00 5150	<u>Instructions to Bidders – AIA A701</u>	<u>Dec 31, 2025</u>	<u>11</u>
00 5200	<u>Contract Forms</u>	<u>Dec 31, 2025</u>	<u>19</u>
00 7200	<u>General Conditions – AIA A201</u>	<u>Dec 31, 2025</u>	<u>39</u>
00 7250	<u>Supplementary Conditions</u>	<u>Dec 31, 2025</u>	<u>10</u>
01 1000	<u>Summary</u>	<u>Dec 31, 2025</u>	<u>1</u>
01 2100	<u>Allowances</u>	<u>Dec 31, 2025</u>	<u>1</u>
01 3000	<u>Administrative Requirements</u>	<u>Dec 31, 2025</u>	<u>5</u>
01 4000	<u>Quality Requirements</u>	<u>Dec 31, 2025</u>	<u>2</u>
01 4100	<u>Regulatory Requirements</u>	<u>Dec 31, 2025</u>	<u>1</u>
01 5000	<u>Temporary Facilities & Controls</u>	<u>Dec 31, 2025</u>	<u>2</u>
01 6000	<u>Product Requirements</u>	<u>Dec 31, 2025</u>	<u>3</u>
01 7000	<u>Execution & Closeout Requirements</u>	<u>Dec 31, 2025</u>	<u>7</u>
01 7800	<u>Closeout Submittals</u>	<u>Dec 31, 2025</u>	<u>3</u>
02 4100	<u>Demolition</u>	<u>Dec 31, 2025</u>	<u>3</u>
03 1000	<u>Concrete Forming and Accessories</u>	<u>Dec 31, 2025</u>	<u>6</u>
03 2000	<u>Concrete Reinforcing</u>	<u>Dec 31, 2025</u>	<u>4</u>
03 3000	<u>Cast-in-Place Concrete</u>	<u>Dec 31, 2025</u>	<u>20</u>
04 2000	<u>Unit Masonry</u>	<u>Dec 31, 2025</u>	<u>4</u>
04 2613	<u>Masonry Veneer</u>	<u>Dec 31, 2025</u>	<u>6</u>
05 3100	<u>Steel Decking</u>	<u>Dec 31, 2025</u>	<u>7</u>
06 1000	<u>Rough Carpentry</u>	<u>Dec 31, 2025</u>	<u>3</u>
06 1600	<u>Sheathing</u>	<u>Dec 31, 2025</u>	<u>6</u>
06 1753	<u>Shop-Fabricated Wood Trusses</u>	<u>Dec 31, 2025</u>	<u>7</u>
06 1800	<u>Glue-Laminated Construction</u>	<u>Dec 31, 2025</u>	<u>6</u>
06 4100	<u>Architectural Wood Casework</u>	<u>Dec 31, 2025</u>	<u>3</u>
06 8316	<u>Fiberglass Reinforced Paneling</u>	<u>Dec 31, 2025</u>	<u>2</u>
07 0553	<u>Fire & Smoke Assembly Identification</u>	<u>Dec 31, 2025</u>	<u>1</u>
07 1113	<u>Bituminous Dampproofing</u>	<u>Dec 31, 2025</u>	<u>3</u>
07 2100	<u>Thermal Insulation</u>	<u>Dec 31, 2025</u>	<u>2</u>
07 2500	<u>Weather Barriers</u>	<u>Dec 31, 2025</u>	<u>3</u>
07 4113	<u>Metal Roof Panels</u>	<u>Dec 31, 2025</u>	<u>4</u>
07 4646	<u>Fiber-Cement Siding</u>	<u>Dec 31, 2025</u>	<u>2</u>
07 5400	<u>Thermoplastic Membrane Roofing</u>	<u>Dec 31, 2025</u>	<u>4</u>
07 6200	<u>Sheet Metal Flashing & Trim</u>	<u>Dec 31, 2025</u>	<u>3</u>
07 7123	<u>Manufactured Gutters & Downspouts</u>	<u>Dec 31, 2025</u>	<u>2</u>
07 8400	<u>Firestopping</u>	<u>Dec 31, 2025</u>	<u>2</u>
07 9200	<u>Joint Sealants</u>	<u>Dec 31, 2025</u>	<u>3</u>
08 1113	<u>Hollow Metal Doors & Frames</u>	<u>Dec 31, 2025</u>	<u>5</u>
08 1416	<u>Flush Wood Doors</u>	<u>Dec 31, 2025</u>	<u>4</u>
08 3100	<u>Access Doors and Panels</u>	<u>Dec 31, 2025</u>	<u>1</u>
08 3613	<u>Sectional Doors</u>	<u>Dec 31, 2025</u>	<u>4</u>
08 4413	<u>Glazed Aluminum Curtain Walls</u>	<u>Dec 31, 2025</u>	<u>5</u>
08 5113	<u>Aluminum Windows</u>	<u>Dec 31, 2025</u>	<u>5</u>
08 7100	<u>Door Hardware</u>	<u>Dec 31, 2025</u>	<u>19</u>
08 8000	<u>Glazing</u>	<u>Dec 31, 2025</u>	<u>6</u>
08 9100	<u>Louvers</u>	<u>Dec 31, 2025</u>	<u>3</u>

<u>09 2116</u>	<u>Gypsum Board Assemblies</u>	<u>Dec 31, 2025</u>	<u>4</u>
<u>09 5100</u>	<u>Acoustical Ceilings</u>	<u>Dec 31, 2025</u>	<u>3</u>
<u>09 6500</u>	<u>Resilient Flooring</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>09 6700</u>	<u>Fluid-Applied Flooring</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>09 9113</u>	<u>Exterior Painting</u>	<u>Dec 31, 2025</u>	<u>4</u>
<u>09 9123</u>	<u>Interior Painting</u>	<u>Dec 31, 2025</u>	<u>5</u>
<u>09 9300</u>	<u>Staining & Transparent Finishing</u>	<u>Dec 31, 2025</u>	<u>3</u>
<u>10 1419</u>	<u>Dimensional Letter Signage</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>10 2800</u>	<u>Toilet, Bath, and Laundry Accessories</u>	<u>Dec 31, 2025</u>	<u>3</u>
<u>10 4400</u>	<u>Fire Protection Specialties</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>10 5113</u>	<u>Metal Lockers</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>10 5613</u>	<u>Metal Storage Shelving</u>	<u>Dec 31, 2025</u>	<u>3</u>
<u>10 7500</u>	<u>Flagpoles</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>11 3013</u>	<u>Residential Appliances</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>12 3600</u>	<u>Countertops</u>	<u>Dec 31, 2025</u>	<u>3</u>
<u>21 0000</u>	<u>Automatic Sprinkler Fire Protection</u>	<u>Dec 31, 2025</u>	<u>3</u>
<u>22 0501</u>	<u>Common Plumbing Requirements</u>	<u>Dec 31, 2025</u>	<u>6</u>
<u>22 0529</u>	<u>Hangers & Supports for Plumbing</u>	<u>Dec 31, 2025</u>	<u>3</u>
<u>22 0548</u>	<u>Vibration/Seismic Controls for Plumbing Piping/Equip.</u>	<u>Dec 31, 2025</u>	<u>4</u>
<u>22 0553</u>	<u>Identification for Plumbing Pipes & Equipment</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>22 0719</u>	<u>Plumbing Piping Insulation</u>	<u>Dec 31, 2025</u>	<u>3</u>
<u>22 1116</u>	<u>Domestic Water Piping</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>22 1119</u>	<u>Domestic Water Piping Specialties</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>22 1313</u>	<u>Facility Sanitary Sewers</u>	<u>Dec 31, 2025</u>	<u>3</u>
<u>22 1319</u>	<u>Facility Sanitary Sewer Specialties</u>	<u>Dec 31, 2025</u>	<u>1</u>
<u>22 3423</u>	<u>Gas Domestic Water Heaters</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>22 4213</u>	<u>Commercial Water Closets & Urinals</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>22 4216</u>	<u>Commercial Lavatories & Sinks</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>23 0501</u>	<u>Common HVAC Requirements</u>	<u>Dec 31, 2025</u>	<u>7</u>
<u>23 0529</u>	<u>Hangers & Supports for HVAC Piping & Equipment</u>	<u>Dec 31, 2025</u>	<u>3</u>
<u>23 0548</u>	<u>Vibration/Seismic Controls for HVAC Piping/Equip.</u>	<u>Dec 31, 2025</u>	<u>4</u>
<u>23 0713</u>	<u>Duct Insulation</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>23 0719</u>	<u>HVAC Piping Insulation</u>	<u>Dec 31, 2025</u>	<u>3</u>
<u>23 1123</u>	<u>Facility Natural Gas Piping</u>	<u>Dec 31, 2025</u>	<u>3</u>
<u>23 2300</u>	<u>Refrigerant Piping</u>	<u>Dec 31, 2025</u>	<u>5</u>
<u>23 2600</u>	<u>Condensate Drain Piping</u>	<u>Dec 31, 2025</u>	<u>1</u>
<u>23 3114</u>	<u>Low Pressure Metal Ducts</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>23 3346</u>	<u>Flexible Ducts</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>23 3400</u>	<u>HVAC Fans</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>23 3713</u>	<u>Diffusers, Registers, & Grilles</u>	<u>Dec 31, 2025</u>	<u>1</u>
<u>23 6213</u>	<u>Air-Cooled Refrigerant Compressor/Condenser Units</u>	<u>Dec 31, 2025</u>	<u>4</u>
<u>26 0501</u>	<u>Common Electrical Requirements</u>	<u>Dec 31, 2025</u>	<u>3</u>
<u>26 0503.1</u>	<u>Electrical Utility Services</u>	<u>Dec 31, 2025</u>	<u>1</u>
<u>26 0519</u>	<u>Line Voltage Electrical Power Conductors & Cables</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>26 0526</u>	<u>Grounding & Bonding for Electrical Systems</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>26 0533</u>	<u>Raceway & Boxes for Electrical Systems</u>	<u>Dec 31, 2025</u>	<u>3</u>
<u>26 2417</u>	<u>Circuit Breaker Panelboards</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>26 2726</u>	<u>Wiring Devices</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>26 2816</u>	<u>Enclosed Switches & Circuit Breakers</u>	<u>Dec 31, 2025</u>	<u>1</u>

<u>26 2900</u>	<u>Generator</u>	<u>Dec 31, 2025</u>	<u>7</u>
<u>26 2901</u>	<u>Automatic Transfer Switch</u>	<u>Dec 31, 2025</u>	<u>5</u>
<u>26 5100</u>	<u>Interior Lighting</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>26 5600</u>	<u>Exterior Lighting</u>	<u>Dec 31, 2025</u>	<u>2</u>
<u>28 3101</u>	<u>Fire Detection & Alarm</u>	<u>Dec 31, 2025</u>	<u>5</u>

.7 — Addenda:

Number	Date	Pages

.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.)

—

☐ — The Sustainability Plan:

Title	Date	Pages

☐ — Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 — Other documents listed below:

(List here any additional documents that are intended to form part of the Proposed Contract Documents.)

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, Paul Doyle, AIA, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 21:11:26 ET on 02/22/2026 under Order No. 500032274_2 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A701™ – 2018, Instructions to Bidders, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

(Title)

(Dated)

END OF SECTION 00 5150

SECTION 00 5200
CONTRACT FORMS

- ☐ Notice of Award
- ☐ Agreement Form – AIA A101
- ☐ Performance Bond
- ☐ Labor and Material Payment Bond
- ☐ Notice to Proceed
- ☐ Application for Payment
- ☐ Change Order

NOTICE OF AWARD

TO: Contractor

1 one St.
Town, SC 20000

RE: IFB 20XX-XX-XXX

The OWNER has considered the BID submitted by you for the above described WORK dated day of month 20XX.

You are hereby notified that your BID has been accepted for the Total Bid Amount of \$ 000,000.00.

You are required by the Information for Bidders to execute the CONTRACT AGREEMENT and furnish the required CONTRACTOR'S PERFORMANCE BOND, PAYMENT BOND (Labor and Materials) and CERTIFICATES OF INSURANCE within TEN (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within TEN (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER's acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this Day of, Month 20XX.

HORRY COUNTY, OWNER

BY: _____

TITLE: Assistant County Administrator

SECTION 00 5200
AIA A101 OWNER CONTRACTOR AGREEMENT

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)

«Horry County Government »« »
«103 Elm Street »
«Loris, South Carolina 29526 »
« »

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

« »« »
« »
« »
« »

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

«HC Goretown Fire Station Addition & Renovations»
365 Liberty Church Road
«Loris, South Carolina 29569»
«Addition and renovations to convert a volunteer fire station to a staffed station.»

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

«Doyle Architecture, LLC »« »
«315 Main Street, Suite 2B »
«Conway, South Carolina 29526 »
« »

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.)

☐ 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.)

[**«X»**] Not later than «two hundred seventy» («270») calendar days from the date of commencement of the Work.

[**« »**] By the following date: « »

§ 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
N/A	

§ 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 « » (\$ « »), 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
N/A	

§ 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
Alt-1: Moisture Mitigation		Moisture testing of existing concrete slab

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

Item	Price
Contingency Allowance	Fifteen Thousand Dollars and Zero Cents (\$15,000.00)
Building Permit Allowance	Three Thousand Five Hundred Dollars and Zero Cents (3,500.00)

§ 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)
Unsuitable Soils	Cubic Yard	
Structural Fill Material Replacement	Cubic Yard	

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

«Should all Contract Work not be completed on or before the Date of Substantial Completion, including extensions made by the Architect/Owner, the Contractor shall pay and the Owner will accept the sum of Five Hundred Dollars and Zero Cents (\$500.00) for each calendar day that is required for the Contractor to complete the Contract Work. »

§ 4.6 Other:

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

«N/A »

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:

«The period covered by each Application for Payment shall be one (1) calendar month ending on the twenty-fifth (25th) day of the month. »

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the «twenty-ninth (29th)» day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the «twentieth (20th)» 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 «twenty-one» («21») 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.)

«Ten Point Zero Percent (10.0%. »

§ 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.)

«N/A »

§ 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.)

«Retainage may be reduced to Five Point Zero Percent (5.0%) at the discretion of the Owner when the Work is at least Fifty Point Zero Percent (50.0%) complete. »

§ 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.)

«The Contractor may submit their final Pay Application for Materials and Labor at Substantial Completion, then a Final Pay Application for the release of Retainage once all Closeout Documents have been submitted to the Architect and approved by all parties. »

§ 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:

«N/A »

§ 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.)

«N/A

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.)

«N/A »

« »

« »

« »

§ 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.)

«To be negotiated between the parties. »

§ 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)

«Mr. John Barnhill, Director of Construction & Maintenance »

«Horry County Construction & Maintenance Department »

«307 Smith Street »

«Conway, South Carolina 29526 »

«Phone: 843-915-5300 »

« »

§ 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 a building information modeling exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with a building information modeling exhibit, 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.)

«N/A »

§ 8.7 Other provisions:

«N/A »

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 Not Used.
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction
- .4 Not Used.
- .5 Drawings

Number	Title	Date
G-001	Cover Sheet & Code Summary	Dec 31, 2025
G-002	Life Safety Plan & Misc Code Requirements	Dec 31, 2025
--	Survey	Dec 31, 2025
AD-101	Demolition Plan & Elevations	Dec 31, 2025
C-1	Civil Cover	Dec 31, 2025
C-2	Civil Legend	Dec 31, 2025
C-3	Civil Notes	Dec 31, 2025
C-4	Removals & SESC Plan	Dec 31, 2025
C-5	Site Plan	Dec 31, 2025
C-6	Utility Plan	Dec 31, 2025
C-7	Grading & Drainage Plan	Dec 31, 2025
C-8	Landscape Plan	Dec 31, 2025
C-9	Civil Details	Dec 31, 2025

C-10	ESC Details	Dec 31, 2025
C-11	SCDOT Details	Dec 31, 2025
C-12	GSWSA Details	Dec 31, 2025
C-13	Septic Details	Dec 31, 2025
C-14	SCDOT Exhibit	Dec 31, 2025
A-101	Ground Floor Plan & Wall Types	Dec 31, 2025
A-102	Reflected Ceiling Plan	Dec 31, 2025
A-103	Roof Plan & Details	Dec 31, 2025
A-104	Finish, Furniture & Equipment Plan / Schedules	Dec 31, 2025
A-201	Exterior Building Elevations	Dec 31, 2025
A-202	Exterior Building Elevations, Dumpster Plan/Elevation/Details	Dec 31, 2025
A-203	Building Sections	Dec 31, 2025
A-301	Wall Sections	Dec 31, 2025
A-302	Wall Sections	Dec 31, 2025
A-303	Wall Sections	Dec 31, 2025
A-304	Wall Sections	Dec 31, 2025
A-305	Wall Sections	Dec 31, 2025
A-306	Wall Sections	Dec 31, 2025
A-401	Exterior Details	Dec 31, 2025
A-501	Door Schedule, Types, & Details	Dec 31, 2025
A-502	Window Schedule, Types, & Details	Dec 31, 2025
A-701	Enlarged Toilet Room Plans/Elevations; Locker Room Elevs & FRP Details	Dec 31, 2025
A-702	Kitchen & Vestibule Elevations	Dec 31, 2025
A-801	Enlarged Cabinet Details	Dec 31, 2025
S1.0	Foundation Plan	Dec 31, 2025
S1.1	Framing Plan	Dec 31, 2025
S2.0	Wall Sections	Dec 31, 2025
S2.1	Wall Sections	Dec 31, 2025
S2.2	Wall Sections	Dec 31, 2025
S2.3	Wall Sections	Dec 31, 2025
S2.4	Schedules & Typical Section Details	Dec 31, 2025
S3.0	Structural General Notes	Dec 31, 2025
P100	Plumbing Schedules, Notes, & Details	Dec 31, 2025
P200	Plumbing Demo Plan	Dec 31, 2025
P201	Plumbing - Waste Plan	Dec 31, 2025
P202	Plumbing - Water Plan	Dec 31, 2025
P203	Plumbing - Gas Plan	Dec 31, 2025
P204	Plumbing - Riser	Dec 31, 2025
M100	Mechanical Schedules, Notes, & Details	Dec 31, 2025
M200	Mechanical Demo Plan	Dec 31, 2025
M201	Mechanical Plan	Dec 31, 2025
E100	Electrical Schedules, Notes, & Details	Dec 31, 2025
E101	Electrical Schedules, Notes, & Details	Dec 31, 2025
E200	Electrical Demo Plan	Dec 31, 2025
E201	Electrical Power Plan	Dec 31, 2025
E202	Electrical Lighting Plan	Dec 31, 2025
E300	Electrical Site Plan	Dec 31, 2025
FA100	Fire Alarm Plan	Dec 31, 2025

.6 Specifications

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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: None.

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

OWNER (Signature)

« »« »

(Printed name and title)

CONTRACTOR (Signature)

« »« »

(Printed name and title)

PERFORMANCE BOND

Bond No. _____

KNOW ALL MEN BY THESE PRESENTS that [full name and address or legal title of Contractor] as Principal, hereinafter called Contractor, and [Bonding Company], a corporation duly organized under the laws of the County, as Surety, hereinafter called Surety, are held and firmly bound unto County as Obligee, in the amount of [a sum equal to at least one half of the Contract price] Dollars (\$ _), for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____, 20_ , entered into a contract with County for [Describe project and insert project number] in accordance with drawings and specifications prepared by [full name and address or legal title of Architect] which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract then this obligation shall be null and void; otherwise it shall remain in full force and effect. The Surety hereby waives notice of any alteration or extension of time made by the County and its obligation is not affected by any such alteration or extension provided the same is within the scope of the contract. Whenever Contractor shall be, and is declared by County to be in default under the Contract, the County having performed County obligations thereunder, the Surety may promptly remedy the default or shall promptly:

- 1) Complete the Contract in accordance with its terms and conditions; or
- 2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by the County and the Surety jointly of the lowest responsive, responsible bidder, arrange for a contract between such bidder and the County, and make available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price," as used in this paragraph, shall mean the total amount properly paid by County to Contractor under the Contract and any amendments thereto, less the amount properly paid by County to Contractor. No right of action shall accrue on this bond to or for the use of any person or corporation other than the County or successors of the County.

Signed and sealed this _ day of _____, 20_ .

(Principal) (Seal)

(Witness)

(Title)

(BONDING
COMPANY)

LABOR AND MATERIAL PAYMENT BOND

Bond No. _____

KNOW ALL MEN BY THESE PRESENTS that [full name and address or legal title of Contractor] as Principal, hereinafter called principal, and [Bonding Company], a corporation duly organized under the laws of the County, as Surety, hereinafter called Surety, are held and firmly bound unto the County as Oblige, hereinafter called County, for the use and benefit of claimants as herein below defined, in the amount of [a sum equal to at least on half of the Contract price] Dollars (\$) for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has by written agreement dated _____, 20____, entered into a contract with County for [Describe project and insert project number] in accordance with drawings and specifications prepared by [full name and address or legal title of Architect] which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS Obligation is such that, if Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

- 1) A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental of equipment directly applicable to the Contract.
- 2) The above-named Principal and Surety hereby jointly and severally agree with the County that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The County shall not be liable for the payment of any costs or expenses of any such suit.
- 3) No suit or action shall be commenced hereunder by any claimant:
 - a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: the Principal, the County, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be personally served or served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal at any place the Principal maintains an office or conducts its business.
 - b) After the expiration of one (1) year following the date on which the last of the labor was performed or material was supplied by the party bringing suit.
 - c) Other than in a court of competent jurisdiction for the county or district in which the construction contract was to be performed.
- d) The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and again improvement, whether

or not claim for the amount of such lien be presented under and against this bond.

Signed and sealed this ____ day of _____, 20 ____.

(Principal) (Seal)

(Witness)

(Title) (BONDING COMPANY)

(Witness)

By _____
(Attorney-in-Fact)

NOTICE TO PROCEED

Date: month/day, 202X

To: **Contractor**
One Road Conway SC, 29526

Project: **Title of Project Bid # XXX-XX-XXX**

You are hereby notified to commence WORK in accordance with the Agreement dated month day year, on or before month day year, and you are to complete the WORK within **XXX** consecutive calendar days thereafter. The date of completion of all WORK is therefore month day year.

OWNER

By: _____

Title: Assist. County Administrator

APPLICATION FOR PAYMENT NO.

TO:(OWNER)

CONTRACT FOR: _____ **PROJECT #:** _____

For work accomplished through the date of: _____

	Contractor's Schedule of Values			All Work Completed to Date	
ITEM	Unit Price	Quantity	Amount	Quantity	Amount
Total (Original Contract)					
Change Order #1					
Change Order #2					

Accompanying Documentation:	GROSS AMOUNT DUE	\$
	LESS % RETAINAGE	\$
	AMOUNT DUE TO DATE	\$
	LESS PREVIOUS PAYMENTS	\$
	AMOUNT DUE THIS APPLICATION	\$

CONTRACTOR'S Certification:

The undersigned CONTRACTOR certifies that (1) all previous progress payments received from OWNER on account of Work done under the Contract referred to above have been applied to discharge in full all obligations of CONTRACTOR incurred in connection with Work covered by prior Applications for Payment number 1 through _____ inclusive; and (2) title to all materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to OWNER at time of payment free and clear of all liens, claims, security interests and encumbrances (except such as covered by Bond acceptable to OWNER).

Dated: _____, 20____

CONTRACTOR

BY: _____

Payment of the above AMOUNT DUE THIS APPLICATION is recommended.

Dated: _____, 20__

ARCHITECT

CHANGE ORDER

No. _____

PROJECT: Pickleball Courts Addition to S. Strand Recreation Center

DATE OF ISSUANCE:

OWNER: Horry County
c/o Engineering Department
P.O. Box 1236
Conway, South Carolina 29528

OWNER'S PROJECT #:

CONTRACTOR:

ARCHITECT: Doyle Architecture, LLC

CONTRACT FOR:

ARCHITECT'S PROJECT #:24-106

You are directed to make the following changes in the Contract Documents.
Description:

Purpose of Change Order:

Attachments (list documents supporting change):

CHANGE IN CONTRACT PRICE: Original Contract Price: \$ _____	CHANGE IN CONTRACT TIME: Original Contract Time _____ days or date
Previous Change Orders No. _____ to No. _____ \$ _____	Net change from previous Change Orders _____ days
Contract Price prior to this Change Order \$ _____	Contract Time Prior to this Change Order _____ days or date
Net increase (decrease) of this Change Order \$ _____	Net increase (decrease) of this Change Order _____ days
Contract Price with all approved Change Orders \$ _____	Contract Time with all approved Change Orders _____ days or date

RECOMMENDED by: _____ Architect/Engineer _____ Contractor: _____

APPROVED by: _____ Owner

END OF SECTION 00 5200



AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

HC Goretown Fire Station Addition & Renovations
365 Liberty Church Road
Loris, South Carolina 29569

Addition and renovations to convert a volunteer fire station to a staffed station.

THE OWNER:

(Name, legal status and address)

Horry County Government
103 Elm Street
Conway, South Carolina 29526

THE ARCHITECT:

(Name, legal status and address)

Doyle Architecture, LLC
315 Main Street, Suite 2B
Conway, South Carolina 29526

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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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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 written protocols governing the transmission and use of, and reliance on, Instruments of Service or any other information or documentation in digital form.

§ 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 written protocols governing the use of, and reliance on, the information contained in the model 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;
- .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

- .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 Deleted in its Entirety.

§ 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.

Additions and Deletions Report for

AIA® Document A201® – 2017

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 21:13:28 ET on 02/22/2026.

PAGE 1

HC Goretown Fire Station Addition & Renovations

365 Liberty Church Road

Loris, South Carolina 29569

Addition and renovations to convert a volunteer fire station to a staffed station.

...

(Name, legal status and address)

Horry County Government

103 Elm Street

Conway, South Carolina 29526

...

Doyle Architecture, LLC

315 Main Street, Suite 2B

Conway, South Carolina 29526

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§ 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.~~ Deleted in its Entirety.

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, Paul Doyle, AIA, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 21:13:28 ET on 02/22/2026 under Order No. 500032274_1 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ – 2017, General Conditions of the Contract for Construction, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

(Title)

(Dated)

END OF SECTION 00 7200

SECTION 00 7250

SUPPLEMENTARY CONDITIONS

GENERAL CONDITIONS

The "General Conditions of the Contract for Construction", AIA Document A201, Sixteenth Edition, 2017, Articles 1 through 15 inclusive, is part of this contract.

SUPPLEMENTS

The following supplements modify, delete and/or add to the General Conditions. Where any article, paragraph or subparagraph in the General Conditions is supplemented by one of the following paragraphs, the provisions of such article, paragraph, or subparagraph shall remain in effect and the supplemental provisions shall be considered as added thereto. Where any article, paragraph or subparagraph in the General Conditions is amended, voided, or superseded by any of the following paragraphs, the provisions of such article, paragraph or subparagraph not so amended, voided, or superseded shall remain in effect.

GENERAL

Wherever the word "Architect" appears in the General Conditions substitute therefor: "Architect/Engineer".

1 - GENERAL PROVISIONS

Add the following:

- 1.1.1.1 The Contractor's Bid shall be part of the Contract Documents.
- 1.1.2.1 Form of Agreement shall be Standard Form of Agreement Between Owner and Contractor, AIA Document Number A101, Current Edition.
- 1.2.1.2 In the event of conflict between the specifications and drawings, the provisions of the specifications shall govern.

ARTICLE 2 - OWNER

Modify as follows:

- 2.1.1 Last line delete "authorized" and substitute therefor "designated".

Add the following:

- 2.3.4.1 The Owner shall pay any building permit, sewer and water impact and tap fees directly to such agencies. Contractor shall notify Owner sufficiently in advance of installation schedule for these items to insure payment of such fees is processed promptly.
- 2.3.6 Delete in its entirety and substitute therefor the following:
- 2.3.6 The Contractor will be furnished, free of charge, eight (8) copies of the Drawings and Specifications and will be furnished, at actual cost of reproduction, as many additional copies as he may require.

ARTICLE 3 - CONTRACTOR

Add the following:

- 3.2.1.1 The following principles shall govern the settlement of disputes which may arise over discrepancies in the contract documents: (a) as between figures given on drawings and the scaled measurements, the figures shall govern - no measurements should be taken by scale as

working dimensions except on large-scale drawings not dimensioned in detail; (b) as between large-scale drawings and small-scale drawings, the larger scale shall govern; (c) as between drawings and specifications, requirements of the specifications shall govern; and (d) as between the Form of Agreement and the Specifications, requirements of the Form of Agreement shall govern. The principles set forth herein shall not alter provisions of Article I, paragraph 1.2.

- 3.6.1 Contractor shall hold Owner and his agents harmless against any claim or liability from pertinent clauses of State Law.
- 3.6.2 The Contractor's attention is directed to Title 12, Chapter 9, Code of laws of South Carolina 1976 as amended concerning withholding tax for non-residents, employees, contractors and subcontractors.
- 3.7.1.1 In order that the inspection services of municipal or county building departments might be made available for plumbing, heating, air conditioning, and electrical work the Contractor shall require that each subcontractor for these specialty contracts apply for, obtain, and pay the cost of a permit and inspection fees for that specialty for which he is a subcontractor; provided that this project is to be constructed within a municipality or county offering such services.
- 3.9.2 Delete in its entirety and substitute therefor the following:
- 3.9.2 The General Contractor shall provide a designated Project Superintendent and submit the Superintendent's resume for approval by the Architect and Owner. The Superintendent must have a minimum of 10 years experience in the same or higher position on projects similar to this project in scope and size, and must be familiar with all aspects of: on-site project coordination, scheduling, safety, submittal review and coordination, and Quality Control as specified in the Contract Documents. All Project Meetings will be conducted by the Project Superintendent, who will be responsible for recording and distributing minutes of the Project Meetings. Changes to the designated Project Superintendent must be approved by the Architect and Owner.

Add the following:

- 3.9.4 Major Subcontractors (Mechanical, Electrical, Plumbing, Fire Sprinkler, Sitework, Concrete, Masonry, Steel Framing, Metal Framing, Roofing, Ceiling, Drywall, and Painting) shall provide a designated Superintendent with 5 years experience in that trade, and the Superintendent must be familiar with project coordination, scheduling, safety, and the Quality Control procedures specified in the Contract Documents. This designated Subcontractor Superintendent must be on-site during all associated subcontractor activities, and must attend all Project Meetings associated with that Subcontractor's scope of work.
- 3.10.1.1 This schedule shall indicate the dates for the starting and completion of various stages of construction and shall be revised monthly as required by the conditions of the work.
- 3.14.3 It is Contractor's duty to coordinate with his subcontractors in advance so that pipe holes, sleeves, inserts, etc., can be installed as work progresses.
- 3.18.3 The Contractor shall not allow the use of asbestos containing products, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work, even if the products are nonfriable and/or contain minimal amounts of asbestos, and even though such products may still be legally installed.
- 3.18.4 The Contractor shall not allow the use of lead materials in public water applications. "Lead Free" solder, flux and pipe must be used in all public drinking water applications as outlined in the 1986 Amendments to the Safe Drinking Water Act. "Lead Free" solder and flux are defined as containing less than 0.2% lead, while valves, pipes and appurtenances must contain less than 8.0% lead.

ARTICLE 4 - ARCHITECT

Add the following:

- 4.2.1.1 In the Specifications or on the Drawings, where the words "as directed", "as required", "as approved", "as permitted" or words of like effect are used, Contractor shall understand that direction, requirement, approval or permission of Architect/Engineer is intended. Similar words "approved", "acceptable", "satisfactory", or words of like importance mean approved by, acceptable to or satisfactory to Architect/Engineer.

Modify as follows:

- 4.2.1 First line following " -----provide", add "general".
- 4.2.10 Delete in its entirety and substitute therefor the following:
- 4.2.10 If a Project Representative is provided, his duties, responsibilities and limitations of authority shall be as set forth in STANDARD FORM OF ARCHITECT'S SERVICES: ON-SITE PROJECT REPRESENTATION, AIA DOCUMENT B207 – 2017 or latest edition, copy of which will be provided to Owner, Contractor and Project Representative.

ARTICLE 5 - SUBCONTRACTORS

Add the following:

- 5.3.1 The Contractor shall assure the Owner, by affidavit or in such other manner as the Owner may approve, that all agreements between the Contractor and his Subcontractors incorporate the provisions of subparagraph 5.3 as necessary to preserve and protect the rights of the Owner and the Architect/Engineer under the Contract Documents with respect to the work to be performed by Subcontractors so that the subcontracting thereof will not prejudice such rights.

ARTICLE 7 - CHANGES IN THE WORK

Add the following:

- 7.1.1.1 Change Orders are effective only after approval by the Owner and the Architect.
- 7.1.4 In determining the cost or credit to the Owner resulting from a change in the work, the allowances for overhead and profit combined, included in the total cost to the Owner, shall not exceed the percentages herein scheduled, as follows:
1. For Prime Contractor, for any work performed by his own forces, 15% of the cost;
 2. For each Subcontractor involved, work performed by his own forces, 15% of the cost;
 3. For the Prime Contractor, for work performed by his Subcontractor, 7% of the amount due the Subcontractor.
- 7.3.7.1 The "cost" as used herein may include all items of labor or materials, the use of power tools and power equipment and all such items of cost as public liability, workmen's compensation insurance, pro rata charges for additional time of foreman, social security, and old age and unemployment insurance other than that mentioned above, supervision, travel, superintendence, timekeepers, clerks, watchmen, small tools, incidental job burdens and general office expense, and all other items not included in the cost as defined above.

ARTICLE 8 - TIME

Modify as follows:

8.3 Delete in its entirety and substitute therefor the following:

8.3 Delay and Extension of Time

8.3.1 Completion time stipulated under other sections of the Contract Documents may be extended by Change Order to provide one additional work day for each full work day that the Contractor is prevented from working by reason of one or more of the following causes:

1. Unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not limited to, catastrophes and/or acts of God, acts of another Contractor in the performance of a separate Contract with the Owner, epidemics, quarantine restrictions, strikes or freight embargoes;
2. An unusual amount of severe weather to such an extent as to be definitely abnormal and beyond conditions that may be reasonably anticipated. For the purpose of this contract, a total of three (3) working days per calendar month shall be anticipated as "normally bad or severe weather", and such time will not be considered justification for an extension of time.
3. Stoppage of work ordered by Owner or Architect/Engineer for reasons over which Contractor has no control.

The Contractor shall, within ten (10) days after the beginning of such delay notify the Owner and Architect/Engineer in writing of the cause of the delay. The contractor shall include with time extension request just cause indicating how delay has affected critical path sequence of construction activities. The Architect/Engineer will then ascertain the facts and extent of delay, and notify the Contractor within (10) days of the Owner's decision in the matter. Notice of delay and requests for extension of time shall set forth the cause and number of additional working days contractor desires contract extended.

8.3.2 No claims for extension of time will be considered when based on delays caused by conditions existing at the time bids were received, and of which the contractor might be reasonably expected to have full knowledge at the time of bidding, or upon delays caused by failure on the part of the contractor to anticipate properly the requirements of the work contracted for as to materials, labor and equipment. All claims for extension of time shall be made in writing to the Architect/Engineer with the next application for payment; otherwise they shall be waived.

8.3.3 Completion date stipulated under other sections of the Contract Documents may be extended by Change Order to compensate for additional work that may be ordered by Owner, provided such work is over and beyond scope of work covered by original contract and is of such nature as to materially affect date of completion.

ARTICLE 9 - PAYMENT AND COMPLETION

Modify as follows:

9.3.1 Third line following "notarized", delete "if required".

Add the following:

9.3.1.3 The Architect/Engineer will authorize, as provided in Paragraphs 9.4 and 9.5, monthly payments equal to ninety (90%) percent of the portion of the contract sum properly allocable to labor, material and equipment incorporated in the work, and allocable to material and equipment suitably stored.

- 9.3.1.4 Contractor's Application for Payment, required for each project separately of a multi-project contract, shall be on Forms furnished by Architect/Engineer which shall include the following statement:

Undersigned Contractor certifies by this Application for Payment has been completed in accordance with Contract Documents, that all amounts have been paid by him for Work for which previous Certificates for Payment were issued and payments received from Owner, and that current payment shown herein is now due.

Contractor:

By:

Date:

Subscribed and sworn to before me this:

Notary Public:

My Commission Expires:

Date:

Add the following:

- 9.3.2.1 Rental equipment such as, but not limited to, mobile equipment, pans, forms, scaffolding, compressors, etc., shall not be considered material stored.
- 9.6.2.1 The Contractor's attention is directed to Title 29, Chapter 7, Code of Laws of South Carolina, 1976, as amended, concerning labors' liens.
- 9.6.2.2 Release of retained funds: When the work to be performed on a state construction contract is to be performed by multiple prime contractors or by a prime contractor and multiple subcontractors, the work contracted to be done by each individual contractor or subcontractor will be considered a separate division of the contract for the purpose of retention. As each such division of the contract is certified as having been completed, that portion of the retained funds which is allocable to the completed division of the contract shall be released forthwith to the prime contractor, who shall, within ten days of its receipt, release to the subcontractor responsible for the complete work the full amount of any retention previously withheld from him by the prime contractor.
- 9.7.1 Nonresident contractor's attention is directed to Title 12, Chapter 9, Code of Laws of South Carolina 1976, as amended, concerning withholding tax on nonresident employees, contractors and subcontractors.

Add the following:

- 9.10.1.1 When the contractor is ready for final inspection, he shall give notice to the Architect/Engineer with a copy to the Owner in the following words:
- The work on the contract for (show name of improvement or project as it appears in the Form of Agreement), having been fully completed, except as stipulated herein below, it is requested that a final inspection be made promptly by the Architect. The following work is incomplete through no fault or negligence of the Contractor: (List any work the contractor regards as exceptionable and after each item substantiate why its incompleteness is not due to his fault or negligence). No final inspection shall be made until such time as the Architect/Engineer and the Owner have received a letter in exact form indicated above.
- 9.10.2.1 Contractor shall submit to Architect/Engineer Contractor's Affidavit of Payment of Debts and Claims on AIA Document G706, latest edition, together with all supporting documents as called

for thereon, including (as applicable):

1. Consent of Surety to Final Payment on AIA document G707, latest edition.
2. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment. Submit in letter form under Contractor's letterhead.
3. Separate Releases or Waivers of Liens from all Subcontractors and Materials and
4. Equipment Suppliers on reproduction of form supplied by Architect/Engineer in contract documents. Accompany with a list thereof.
5. Contractor's Affidavit of Release of Liens on AIA Document G706A, latest edition.

9.10.3.1 The balance payable under conditions stated shall reflect retainage for thrice the value of uncompleted work, as determined by the Architect/Engineer, but not more than 10% of the contract amount.

ARTICLE 11 - INSURANCE AND BONDS

Delete Article in its entirety and substitute therefor the following:

ARTICLE 11 - INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 The Contractor shall purchase and maintain in a company or companies acceptable to the Owner such insurance as will protect him from claims set forth below which may arise out of or result from the Contractor's operations under the Contract, whether such operations be by himself or by any Subcontractor or by anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable.

1. Claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts;
2. Claims for damages because of bodily injury, occupational sickness or disease, or death of his employees;
3. Claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees;
4. Claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (2) by any other person;
5. Claims for damages, other than to the work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom; and
6. Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

11.1.2 The insurance required by Subparagraph 11.1.1 shall be written for not less than any limits of liability specified in the contract documents, or required by law, whichever is greater.

11.1.2.1 Minimum limits of liability for following types of insurance are required (B.I.= Bodily Injury; P.D.= Property Damage; Limits are shown in thousands of dollars).

1. Workmen's Compensation, including:
 - a. Workmen's Compensation Insurance-Statutory
 - b. Employers' Liability -100 each occurrence form
2. Comprehensive General Liability, including:

- a. Premises and Operations, 1000 B.I.; 250 P.D.
- b. Contractual/Owner's Liability, 1000 B.I.; 250 P.D.
- c. Contractor's Protective Liability, 1000 B.I.; 250 P.D.
- d. Products Liability, including Completed Operations Coverage, 1000 B.I.; 250 P.D.

3. Comprehensive Automobile Liability, including:

- a. All owned Automobiles, 1000 B.I.; 250 P.D.
- b. Non-owned Automobiles, 1000 B.I.; 250 P.D.
- c. Hired Car Coverage, 1000 B.I.; 250 P.D.

11.1.2.2 In addition to Contractual Liability including indemnification provision Bodily Injury and Property Damage coverage under both Comprehensive General and Comprehensive Automobile forms shall include "occurrence" basis wording, which means an event, or continuous or repeated exposure to conditions which unexpectedly causes injury or damage during policy period.

11.1.2.3 Contractor shall either (a) require each of his Subcontractors to procure and maintain during the life of his contract, Subcontractors Comprehensive General Liability Insurance, Automobile Liability, and Property Damage Liability Insurance of the type and in the same amounts as specified in this Subparagraph, or (b) insure the activities of his Subcontractors in his own policy.

11.1.3 The insurance required by Subparagraph 11.1.1 shall include contractual liability insurance applicable to the Contractor's obligations under Paragraph 3.18.

11.1.3.1 CERTIFICATE OF INSURANCE MUST BE FILED THROUGH ARCHITECT/ENGINEER ON AIA DOCUMENT G715 – 2017 or LATEST EDITION, by an insurer authorized to do business in South Carolina by South Carolina State Insurance Commission. All blanks and questions on Certificate must be filled out completely. Incomplete or inadequate certificate will be returned to Contractor as unsatisfactory and commencement of his work will be delayed until satisfactory certificate is submitted. Such delay will not warrant extension of contract time.

11.1.4 Certificates of Insurance acceptable to Owner shall be filed with the Owner prior to commencement of the work. These certificates shall contain a provision that coverage afforded under the policies will not be canceled until at least thirty days prior written notice has been given to the Owner.

11.2 OWNER'S LIABILITY INSURANCE

11.2.1 The Contractor shall be responsible for purchasing and maintaining complete Owner's Protective Liability Insurance covering claims which may arise from operations under the Contract. The Contractor shall file a copy of all Owner's protective liability insurance policies with the Owner before any exposure to loss may occur. Limits shall be the same as specified for general liability and property damage insurance.

11.3 PROPERTY INSURANCE

11.3.1 Unless otherwise provided, the Owner shall purchase and maintain property insurance upon the entire work at the site to the full insurable value thereof. This insurance shall include the interests of the Owner, the Contractor, Subcontractors, Sub-subcontractors in the work and shall insure against the perils of fire, extended coverage, vandalism, glass breakage and malicious mischief. A deductible of \$100.00 shall apply to each loss resulting from vandalism, glass breakage and malicious mischief. The deductible shall be borne by the Contractor. This insurance does not cover any tools owned by mechanics, any tools, equipment, scaffolding, staging towers and forms owned or rented by the Contractor which are not intended to become part of the project. This insurance shall also not cover any loss by theft or burglary, or damage to the building or contents

as a result of said theft or burglary. The interest of the Owner, the Contractor, Subcontractors, Sub-subcontractors in this insurance shall only be effective during the construction of the project and all rights and interest of the Contractor, Subcontractors in this insurance shall only be effective during the construction of the project and all rights and interest of the Contractor, Subcontractor, and Sub-subcontractors in this insurance shall end upon the acceptance of the project by the Owner.

- 11.3.2 The Owner shall purchase and maintain such boiler and machinery insurance as may be required by the Contract Documents or by Law. This insurance shall include the interest of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the work. The interest of the Contractor, Subcontractors and Sub-subcontractors in this insurance shall only be during the time of the construction of the project and all rights and interest in this insurance shall end upon acceptance of the project by the Owner.
- 11.3.3 Any insured loss is to be adjusted with the Owner and made payable to the Owner as trustee for the insured, as their interests may appear, subject to the requirements of any applicable mortgage clause.
- 11.3.4 The Owner shall file a certificate of all policies with the Contractor before an exposure to loss may occur. If the Owner does not intend to purchase such insurance, he shall inform the Contractor in writing prior to commencement of the work. The Contractor then shall effect insurance which shall protect the interest of himself, his subcontractors and the sub-subcontractors in the work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure of the Owner to purchase or maintain such insurance and so notifies the Owner, then the Owner shall bear all reasonable cost appropriately attributable thereto.
- 11.3.5 If the Contractor requests in writing that insurance for special hazards be included in the Property Insurance Clause, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.
- 11.3.6 The Owner and Contractor waive all rights against each other for damages caused by fire and other perils to the extent covered by insurance provided under Paragraph 11.3 except such rights as they may have to the proceeds of such insurance held by the Owner as trustee. The Contractor shall require similar waivers by Subcontractors and Sub-subcontractors in accordance with clause 5.3.1.1. This waiver does not apply to any defects due to faulty material or workmanship by the Contractor. The Subcontractors or Sub-subcontractors and the Contractor shall remedy any defects due to such faulty materials or workmanship and pay for any damage to other work resulting therefrom, which shall appear within a period of one year from the date of acceptance as defined in the general conditions and in accordance with the terms of any special guarantees provided in the contract. The Owner shall give notice of observed defect within ninety days of the time they were observed or should have been observed.
- 11.3.7 If required in writing by any party in interest, the Owner as trustee shall, upon the occurrence of an insured loss, deposit in a separate account any money received for such loss, and he shall distribute it in accordance with such agreement as the parties in interest may reach. If after such loss no other special agreement is made, replacement of damaged work shall be covered by an appropriate Change Order.
- 11.3.8 The Owner as trustee shall have the power to adjust and settle with the insurers.
- 11.3.9 If the Owner finds it necessary to occupy or use a portion or portions of the work prior to substantial completion thereof, such occupancy shall not commence prior to a time mutually agreed to by the Owner and Contractor and to which the insurance company or companies providing the property insurance shall not be canceled or lapsed on account of such partial

occupancy. Consent of the Contractor and of the insurance company or companies to such occupancy or use shall not be unreasonably withheld.

- 11.3.10 Any wall or steel construction during this period of coverage must be properly braced, regardless of plans or specifications otherwise, to prevent damage from wind. Any alleged damage must be inspected by a Representative of the Fund, prior to any cleaning or repair. Liability will not be accepted by the Fund if provisions of this Endorsement are not complied with.
- 11.4.1 Delete in its entirety and substitute therefor the following:
- 11.4.1 A Performance Bond and Labor and Material Payment Bond are required. The Contractor shall obtain a Performance Bond and Labor and Material Payment Bond, acceptable to the Owner in a surety company authorized to do business in the state in which the Project is constructed. The Performance Bond shall be in an amount equal to One Hundred Percent (100%) of the full amount of the Contract Sum as security for the faithful performance of the Contract Documents, and the Labor and Material Payment Bond shall be in an amount equal to One Hundred Percent (100%) of the full amount of the Contract Sum as security for the payment of all persons performing labor and furnishing materials in connection with the Contract Documents. Such bonds shall be on forms approved by the Owner and shall name the Owner as a primary co- obligee. The bonds shall guarantee the Contractor's faithful performance of the Contract and the payment of all obligations arising thereunder. The bonds shall remain in force until (1) the Project has been completed and accepted by the Owner, (2) the provisions of all guarantees required by these Contract Documents have been fulfilled, and the time limitation for all guarantees has expired, or (3) until the time for the filing of all mechanic's liens has expired, whichever is longer, after which it shall become void. The Contractor shall pay all changes in connection with these bonds as a part of the Contract. One executed copy of the bonds shall be attached to each copy of the Contract before they are returned to the Architect for the Owner's signature. These bonds shall be written on AIA Document A312, latest edition. A current Power of Attorney shall be attached to each bond.

ARTICLE 13 - MISCELLANEOUS PROVISIONS

Add the following:

- 13.1.1 By executing a contract for the Project the Contractor agrees to submit itself to the jurisdiction of the courts of the State of South Carolina for all matters arising or to arise hereunder, including but not limited to performance of said contract and payment of all licenses and taxes of whatever nature applicable thereto.
- 13.4.2.1 Materials subject to test shall be inspected by a testing agency selected by the Architect/Engineer and satisfactory to the Owner. The Contractor shall defray the cost of tests conducted pursuant to laws, ordinances, rules, regulations or orders of any public authority having jurisdiction; the cost of test conducted for his own information and in his own interest; and the cost of tests which are named in the Technical Sections of the Specifications as tests to be paid for by the Contractor.
- 13.6 REGULATORY REQUIREMENTS
 - 13.6.1 Compliance with EEOC and other State and Federal Laws: To the extent set forth in the respective statutes, Provider shall comply with the provisions of:
 - 13.6.2 Title VII of the Civil Rights Act of 1964;
 - 13.6.3 Age Discrimination in Employment Act of 1967;
 - 13.6.4 Title I of the Americans with Disabilities Act of 1990;

- 13.6.5 Equal Pay Act of 1963;
- 13.6.6 Fair Labor Standards Act of 1938;
- 13.6.7 Immigration Reform and Control Act of 1986; and
- 13.6.8 South Carolina Wages Act, S.C. Code § 37-10-10 *et seq.*
- 13.6.9 South Carolina Worker's Compensation Act, S.C. Code § 42-1-10 *et seq.*
- 13.6.10 South Carolina Illegal Immigration Reform Act, including without limitation Chapters 14 & 29, Title 8, and Chapter 8, Title 41, S.C. Code of Laws.
- 13.6.11 Part 681, Title 16 of the Code of Federal Regulations, Sections 114 and 315 of the Fair and Accurate Credit Transactions Act (FACTA) of 2003; the South Carolina Act 190 of 2008; Financial and Identity Theft Protection Act; and the Horry County Privacy / Identity Theft Policy.

ARTICLE 14 - TERMINATION OR SUSPENSION OF THE CONTRACT

Add the following:

- 14.3.2.3 that extended overhead exceeds five working days when the Owner in writing stops work for his convenience or a natural disaster. Extended overhead is denied for change orders, change directives, and other delays.

ARTICLE 15 – CLAIMS AND DISPUTES

Add the following:

- 15.2.9 Any controversy or claim arising out of or related to the Contract or the breach thereof will be settled in accordance with the laws of the State of South Carolina.
- 15.3 Delete in its entirety and substitute therefor the following:
- 15.4 Delete in its entirety and substitute therefor the following:

Article 15.3 Mediation/Arbitration

- 15.3.1 Disputes Resolutions: All claims, disputes, and other matters in questions between the parties to this Agreement, arising out of or relating to this Agreement of the breach thereof, shall be tried before a Circuit Judge or Master in Equity of Horry County without a jury. The contractor hereby waives its right to a jury trial and agrees that the venue of the action will be in Horry County, South Carolina. Any legal proceedings arising out of or relating to this Agreement shall include, by consolidation, joinder or joint filing, any additional person or entity not a party to this agreement to the extend necessary to the final resolution of the matter in controversy. Owner shall include the same disputes resolution and consolidation provisions in the owner's contractor (or construction manager) agreement and shall provide that similar provisions be included in contractor or subcontractor agreements.

END OF SECTION 00 7250

SECTION 01 1000 SUMMARY

PART 1 GENERAL

1.01 PROJECT

- A. Project Name: Goretown Fire Station Additions & Renovations
- B. Owner's Name: Horry County Government.
- C. Architect's Name: Doyle Architecture, LLC.
- D. The Project consists of the addition to and interior renovation of the existing fire station building.

1.02 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 5200 - Agreement Form.

1.03 DESCRIPTION OF ALTERATIONS WORK

- A. Scope of demolition and removal work is indicated on drawings and specified in Section 02 4100.
- B. Scope of alterations work is indicated on drawings.
- C. Plumbing: Alter existing and add new construction.
- D. HVAC: Alter existing and add new construction.
- E. Electrical Power and Lighting: Alter existing and add new construction.

1.04 OWNER OCCUPANCY

- A. Owner intends to occupy the Project upon Substantial Completion of the Work.

1.05 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to the property lines surrounding the property.
- B. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- C. Utility Outages and Shutdown:
 - 1. Prevent accidental disruption of utility services to other facilities.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 2100
ALLOWANCES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cash allowances.
- B. Contingency allowance.

1.02 CASH ALLOWANCES

- A. Costs Included in Cash Allowances: Cost of product to Contractor or subcontractor, less applicable trade discounts .

1.03 CONTINGENCY ALLOWANCE

- A. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.
- B. Funds will be drawn from the Contingency Allowance only by Change Order.
- C. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.04 ALLOWANCES SCHEDULE

- A. Contingency Allowance: Include the stipulated sum/price of \$15,000.00 for use in addressing unforeseen conditions upon Owner's instructions.
- B. Cash Allowance: Include the stipulated sum/price of \$3,500.00 for use in purchasing a building permit.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General administrative requirements.
- B. Preconstruction meeting.
- C. Progress meetings.
- D. Construction progress schedule.
- E. Progress photographs.
- F. Submittals for review, information, and project closeout.
- G. Number of copies of submittals.
- H. Requests for Interpretation (RFI) procedures.
- I. Submittal procedures.

1.02 RELATED REQUIREMENTS

- A. Section 01 6000 - Product Requirements: General product requirements.
- B. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.
- C. Section 01 7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.03 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 01 7000 - 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. Shop drawings, product data, and samples.
 - 3. Test and inspection reports.
 - 4. Applications for payment and change order requests.
 - 5. Progress schedules.
 - 6. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 7. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

- A. Schedule meeting after Notice of Award but before the Date of Commencement.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.
 - 3. Contractor.
 - 4. Mechanical, Electrical, Plumbing, Masonry, and Sitework Subcontractors.
- 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, schedule of values, and progress schedule.
 5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 6. Scheduling.
- D. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum weekly 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. Maintenance of quality and work standards.
 11. Effect of proposed changes on progress schedule and coordination.
 12. Other business relating to work.
- E. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.03 CONSTRUCTION PROGRESS SCHEDULE

- A. Within 10 days after date of the Agreement, submit preliminary schedule .
- B. If preliminary schedule requires revision after review, submit revised schedule within 5 days.
- C. Submit updated schedule with each Application for Payment.

3.04 PROGRESS PHOTOGRAPHS

- A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment.
- B. Photography Type: Digital; electronic files.
- C. 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.

- D. 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. 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.

3.05 REQUESTS FOR INTERPRETATION (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 the Contract Documents.
 - 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of the 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. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- C. 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.
- D. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- E. 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.
- F. 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.
- G. 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. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 - 2. 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.

3.06 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 the 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 7800 - Closeout Submittals.

3.07 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 7800 - 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.

3.08 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. Samples: Submit the number specified (minimum of two) in individual specification sections; one of which will be retained by Architect.
 1. Retained samples will not be returned to Contractor unless specifically so stated.

3.09 SUBMITTAL PROCEDURES

- A. General Requirements:
 1. Use a separate transmittal for each item.
 2. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
 3. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
 4. 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.
 5. 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 or via a project management online service to Architect.
 6. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 7 calendar days excluding delivery time to and from the Contractor.
 7. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
 8. Provide space for Contractor and Architect review stamps.

9. When revised for resubmission, identify all changes made since previous submission.
 10. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
 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. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related work.
 2. Do not reproduce the 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.

3.10 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.
 2. Not Authorizing fabrication, delivery, and installation:
 - a. "Revise and Resubmit".
 - 1) Resubmit revised item, with review notations acknowledged and incorporated.
 - b. "Rejected".
 - 1) Submit item complying with requirements of Contract Documents.

END OF SECTION

SECTION 01 4000 QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submittals.
- B. Testing and inspection agencies and services.
- C. Control of installation.
- D. Defect Assessment.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Test Reports: After each test/inspection, promptly submit two copies of report to the Owner, to the Architect, and to the 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.

1.03 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Owner will 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.

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 TESTING AND INSPECTION

- 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/inspections specified.
- B. 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.
- C. Contractor Responsibilities:
 - 1. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 - 2. 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.
 - 3. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 - 4. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- D. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- E. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.03 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.

END OF SECTION

**SECTION 01 4100
REGULATORY REQUIREMENTS**

PART 1 GENERAL

1.01 SUMMARY OF REFERENCE STANDARDS

- A. Regulatory requirements applicable to this project are the following:
- B. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- C. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- D. 29 CFR 1910 - Occupational Safety and Health Standards; current edition.
- E. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.
- F. ICC (IFC) - International Fire Code; 2012.
- G. ICC (IBC) - International Building Code; 2015.
- H. ICC (IPC) - International Plumbing Code; 2015.
- I. ICC (IMC) - International Mechanical Code; 2012.
- J. ICC (IFGC) - International Fuel Gas Code; 2012.
- K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- L. ICC (IECC) - International Energy Conservation Code; 2012.

1.02 RELATED REQUIREMENTS

- A. Section 01 4000 - Quality Requirements.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary telecommunications services.
- C. Temporary sanitary facilities.
- D. Temporary Controls: Barriers, enclosures, and fencing.
- E. Vehicular access and parking.
- F. Waste removal facilities and services.

1.02 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

1.03 TEMPORARY UTILITIES

- A. Owner will provide the following:
 - 1. Electrical power , consisting of connection to existing facilities.
 - 2. Water supply, consisting of connection to existing facilities.

1.04 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.

1.05 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Use of existing facilities located at the existing fire station is not permitted.
- C. Maintain daily in clean and sanitary condition.

1.06 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

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. Provide and maintain access to fire hydrants, free of obstructions.
- C. Provide means of removing mud from vehicle wheels before entering streets.
- D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.08 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 6000
PRODUCT REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Transportation, handling, storage and protection.
- B. Substitution limitations.

1.02 RELATED REQUIREMENTS

- A. Document 00 2113 - Instructions to Bidders: Product options and substitution procedures prior to bid date.

1.03 SUBMITTALS

- A. 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.
- B. 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.
- C. 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 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Use of products having any of the following characteristics is not permitted:
 - 1. Made using or containing CFC's or HCFC's.
 - 2. Made of wood from newly cut old growth timber.
 - 3. Containing lead, cadmium, or asbestos.

2.02 PRODUCT OPTIONS

- A. 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.
- B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named. Substitution Requests must be made prior to the Bid or they will not be reviewed.

2.03 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. Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period and the documents required. Comply with requirements specified in Section 00 2113.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

- C. A request for substitution 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.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. 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.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
- D. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

3.02 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.

3.03 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.
- 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. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Do not store products directly on the ground.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

END OF SECTION

SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.
- 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 1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01 3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.

1.03 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.04 SUBMITTALS

- A. See Section 01 3000 - 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. 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.

1.05 QUALIFICATIONS

- A. 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,
- B. 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.

- C. 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.

1.06 PROJECT CONDITIONS

- A. Use of explosives is not permitted.
- B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- D. Perform dewatering activities, as required, for the duration of the project.
- E. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- F. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
 - 1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
- G. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

1.07 COORDINATION

- A. See Section 01 1000 for occupancy-related requirements.
- B. 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.
- C. Notify affected utility companies and comply with their requirements.
- D. 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.
- E. 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.
- F. In finished areas, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- G. Coordinate completion and clean-up of work of separate sections.
- H. 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.

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 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- D. Utilize recognized engineering survey practices.
- E. 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. Building foundation, column locations, ground floor elevations.

3.04 GENERAL INSTALLATION REQUIREMENTS

- A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.
- B. 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.
- C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as indicated.

2. Report discrepancies to Architect before disturbing existing installation.
 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
 2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- C. Remove existing work as indicated and as required to accomplish new work.
1. Remove items indicated on drawings.
 2. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 3. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- D. Services (Including but not limited to HVAC, Plumbing, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
 3. Verify that abandoned services serve only abandoned facilities.
 4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- E. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.
- F. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
1. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
- G. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- H. Refinish existing surfaces as indicated:
1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
- I. Clean existing systems and equipment.
- J. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- K. Do not begin new construction in alterations areas before demolition is complete.
- L. Comply with all other applicable requirements of this section.

3.06 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. 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 and replace defective and non-complying work.
- D. 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.
- E. Restore work with new products in accordance with requirements of Contract Documents.
- F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.
- H. 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. 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.
- C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- D. Verify that wiring and support components for equipment are complete and tested.
- E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- F. 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.
- G. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
- C. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of Owner's personnel.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

3.11 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.12 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- 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,
- 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. Replace 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.
- B. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- C. 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.
- D. 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.
- E. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- F. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- G. 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. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

**SECTION 01 7800
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 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.
- C. Individual Product Sections: Specific requirements for operation and maintenance data.
- D. 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. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 2. 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.
 - 3. 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. 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. 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.
- E. 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.
- F. Provide servicing and lubrication schedule, and list of lubricants required.
- G. Include manufacturer's printed operation and maintenance instructions.
- H. Include sequence of operation by controls manufacturer.
- I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- J. Provide control diagrams by controls manufacturer as installed.
- K. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- L. Include test and balancing reports.
- M. Additional Requirements: As specified in individual product specification sections.

3.05 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. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

SECTION 02 4100 DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Selective demolition of built site elements.
- B. Selective demolition of building elements for alteration purposes.
- C. Abandonment and removal of existing utilities and utility structures.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- C. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Comply with applicable requirements of NFPA 241.
 - 3. Use of explosives is not permitted.
 - 4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 5. Provide, erect, and maintain temporary barriers and security devices.
 - 6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
 - 7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 8. Do not close or obstruct roadways or sidewalks without permit.
 - 9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Do not begin removal until built elements to be salvaged or relocated have been removed.
- D. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.
- E. Protect existing structures and other elements that are not to be removed.
 - 1. Provide bracing and shoring.
 - 2. Prevent movement or settlement of adjacent structures.

3. Stop work immediately if adjacent structures appear to be in danger.
- F. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- G. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

3.02 EXISTING UTILITIES

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- E. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
- F. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.03 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 1. Verify that construction and utility arrangements are as indicated.
 2. Report discrepancies to Architect before disturbing existing installation.
 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
- C. Remove existing work as indicated and as required to accomplish new work.
 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
 2. Remove items indicated on drawings.
- D. Services (Including but not limited to HVAC, Plumbing, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
 2. Verify that abandoned services serve only abandoned facilities before removal.
 3. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.
- E. Protect existing work to remain.
 1. Prevent movement of structure; provide shoring and bracing if necessary.
 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.
 4. Patch as specified for patching new work.

3.04 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.

END OF SECTION

SECTION 031000 - CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Form-facing material for cast-in-place concrete.
 - 2. Shoring, bracing, and anchoring.

1.2 DEFINITIONS

- A. Form-Facing Material: Temporary structure or mold for the support of concrete while the concrete is setting and gaining sufficient strength to be self-supporting.
- B. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review the following:
 - a. Special inspection and testing and inspecting agency procedures for field quality control.
 - b. Construction, movement, contraction, and isolation joints
 - c. Forms and form-removal limitations.
 - d. Shoring and reshoring procedures.
 - e. Anchor rod and anchorage device installation tolerances.

1.4 ACTION SUBMITTALS

- A. Product Data: For each of the following:
 - 1. Exposed surface form-facing material.
 - 2. Concealed surface form-facing material.
 - 3. Form ties.
 - 4. Waterstops.
 - 5. Form-release agent.
- B. Shop Drawings: Prepared by, and signed and sealed by, a qualified professional engineer responsible for their preparation, detailing fabrication, assembly, and support of forms.
 - 1. For exposed vertical concrete walls, indicate dimensions and form tie locations.
 - 2. Indicate dimension and locations of construction and movement joints required to construct the structure in accordance with **ACI 301**.
 - a. Location of construction joints is subject to approval of the Architect.
 - 3. Indicate location of waterstops.
 - 4. Indicate proposed schedule and sequence of stripping of forms, shoring removal, and reshoring installation and removal.

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- C. Samples: For waterstops.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

- A. Mockups: Formed surfaces to demonstrate typical joints, surface finish, texture, tolerances, and standard of workmanship.
 - 1. Build panel approximately 100 sq. ft. in the location indicated or, if not indicated, as directed by Architect.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with **ACI 301**, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.
 - 1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."
 - 2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.

2.2 FORM-FACING MATERIALS

- A. As-Cast Surface Form-Facing Material:
 - 1. Provide continuous, true, and smooth concrete surfaces.
 - 2. Furnish in largest practicable sizes to minimize number of joints.
 - 3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete," and as follows:
 - a. Plywood, metal, or other approved panel materials.
- B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.
 - 1. Provide lumber dressed on at least two edges and one side for tight fit.

2.3 WATERSTOPS

- A. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.
 - 1. Basis of Design: Greenstreak; Swellstop

2.4 RELATED MATERIALS

- A. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- B. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- C. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- D. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.
 - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

- A. Comply with ACI 301.
- B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 and to comply with the Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete" for as-cast finishes.
- C. Limit concrete surface irregularities as follows:
 - 1. Surface Finish-3.0: ACI 117 Class A, 1/8 inch.
- D. Construct forms tight enough to prevent loss of concrete mortar.
 - 1. Minimize joints.
 - 2. Exposed Concrete: Symmetrically align joints in forms.
- E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.
 - 1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
 - 2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 3. Install keyways, reglets, recesses, and other accessories, for easy removal.
- F. Do not use rust-stained, steel, form-facing material.

- G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.
 - 1. Provide and secure units to support screed strips
 - 2. Use strike-off templates or compacting-type screeds.
- H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.
 - 1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
 - 2. Locate temporary openings in forms at inconspicuous locations.
- I. Chamfer exterior corners and edges of permanently exposed concrete.
- J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches.
- K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.
 - 1. Determine sizes and locations from trades providing such items.
 - 2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.
- L. Construction and Movement Joints:
 - 1. Construct joints true to line with faces perpendicular to surface plane of concrete.
 - 2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 3. Place joints perpendicular to main reinforcement.
 - 4. Locate joints for beams, slabs, joists, and girders in the middle third of spans.
 - a. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 - 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 6. Space vertical joints in walls as indicated on Drawings.
 - a. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
- M. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.
 - 1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
 - 2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.
- N. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- O. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- P. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.
 - 1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
 - 3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 4. Clean embedded items immediately prior to concrete placement.

3.3 INSTALLATION OF WATERSTOPS

- A. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated on Drawings, according to manufacturer's written instructions, by adhesive bonding, mechanically fastening, and firmly pressing into place.
 - 1. Install in longest lengths practicable.
 - 2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
 - 3. Protect exposed waterstops during progress of the Work.

3.4 REMOVING AND REUSING FORMS

- A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.
 - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
 - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work.
 - 1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
 - 2. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.
 - 1. Align and secure joints to avoid offsets.
 - 2. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.5 SHORING AND RESHORING INSTALLATION

- A. Comply with **ACI 318** and **ACI 301** for design, installation, and removal of shoring and reshoring.
 - 1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

- B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.
- C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.6 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
 - 1. Inspect formwork for shape, location, and dimensions of the concrete member being formed.
 - 2. Inspect insulating concrete forms for shape, location, and dimensions of the concrete member being formed.

END OF SECTION 031000

SECTION 032000 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Steel reinforcement bars.
 - 2. Welded-wire reinforcement.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review the following:
 - a. Special inspection and testing and inspecting agency procedures for field quality control.
 - b. Construction contraction and isolation joints.
 - c. Steel-reinforcement installation.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Each type of steel reinforcement.
 - 2. Bar supports.
- B. Shop Drawings: Comply with ACI SP-066:
 - 1. Include placing drawings that detail fabrication, bending, and placement.
 - 2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
- C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.
 - 1. Location of construction joints is subject to approval of the Architect.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Test Reports: For the following, from a qualified testing agency:
 - 1. Steel Reinforcement:
 - a. For reinforcement to be welded, mill test analysis for chemical composition and carbon equivalent of the steel in accordance with ASTM A706/A706M.
- B. Field quality-control reports.
- C. Minutes of preinstallation conference.

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1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
- B. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4/D 1.4M.
- C. Mockups: Reinforcing for cast-concrete formed surfaces, to demonstrate tolerances and standard of workmanship.
 - 1. Build panel approximately 100 sq. ft. for formed surface in the location indicated on Drawings or, if not indicated, as directed by Architect.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
 - 1. Store reinforcement to avoid contact with earth.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.
- B. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.2 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
 - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
- B. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch in diameter.
 - 1. Finish: Plain-

2.3 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protection of In-Place Conditions:
 - 1. Do not cut or puncture vapor retarder.
 - 2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
 - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
 - 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than **1 inch**, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with **ACI 318**.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
 - 1. Bars indicated to be continuous, and all vertical bars shall be lapped not less than 36 bar diameters at splices, or **24 inches**, whichever is greater.
 - 2. Stagger splices in accordance with **ACI 318**.
 - 3. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.
- G. Install welded-wire reinforcement in longest practicable lengths.
 - 1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
 - a. For reinforcement less than W4.0 or D4.0, continuous support spacing shall not exceed **12 inches**.
 - 2. Lap edges and ends of adjoining sheets at least one wire spacing plus **2 inches** for plain wire and **8 inches** for deformed wire.
 - 3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
 - 4. Lace overlaps with wire.

3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement.
 - 2. Continue reinforcement across construction joints unless otherwise indicated.
 - 3. Do not continue reinforcement through sides of strip placements of floors and slabs.

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- B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

- A. Comply with **ACI 117**.

3.5 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
 - 1. Steel-reinforcement placement.
 - 2. Steel-reinforcement welding.

END OF SECTION 032000

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete Subcontractor.
2. Review the following:
 - a. Special inspection and testing and inspecting agency procedures for field quality control.
 - b. Construction joints, control joints, isolation joints, and joint-filler strips.
 - c. Semirigid joint fillers.
 - d. Vapor-retarder installation.
 - e. Anchor rod and anchorage device installation tolerances.
 - f. Cold and hot weather concreting procedures.
 - g. Concrete finishes and finishing.
 - h. Curing procedures.
 - i. Forms and form-removal limitations.
 - j. Shoring and reshoring procedures.
 - k. Methods for achieving specified floor and slab flatness and levelness.
 - l. Floor and slab flatness and levelness measurements.
 - m. Concrete repair procedures.
 - n. Concrete protection.
 - o. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)
 - p. Protection of field cured field test cylinders.

1.4 ACTION SUBMITTALS

- A. Product Data: For each of the following.

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1. Portland cement.
2. Fly ash.
3. Aggregates.
4. Admixtures:
 - a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
5. Fiber reinforcement.
6. Vapor retarders.
7. Curing materials.
8. Joint fillers.
9. Repair materials.

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Minimum 28-day compressive strength.
3. Durability exposure class.
4. Maximum w/cm.
5. Calculated equilibrium unit weight, for lightweight concrete.
6. Slump limit.
7. Air content.
8. Nominal maximum aggregate size.
9. Synthetic macro-fiber content.
10. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
11. Include manufacturer's certification that permeability-reducing admixture is compatible with mix design.
12. Include certification that dosage rate for permeability-reducing admixture matches dosage rate used in performance compliance test.
13. Intended placement method.
14. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Shop Drawings:

1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - a. Location of construction joints is subject to approval of the Architect.

D. Concrete Schedule: For each location of each Class of concrete indicated in "Concrete Mixtures" Article, including the following:

1. Concrete Class designation.
2. Location within Project.
3. Exposure Class designation.
4. Formed Surface Finish designation and final finish.
5. Final finish for floors.
6. Curing process.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:

1. Installer: Include copies of applicable ACI certificates.

2. Ready-mixed concrete manufacturer.
3. Testing agency: Include copies of applicable ACI certificates.

B. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Fiber reinforcement.
4. Curing compounds.
5. Bonding agents.
6. Adhesives.
7. Vapor retarders.
8. Semirigid joint filler.
9. Joint-filler strips.
10. Repair materials.

C. Material Test Reports: For the following, from a qualified testing agency:

1. Portland cement.
2. Fly ash.
3. Aggregates.
4. Admixtures:
 - a. Permeability-Reducing Admixture: Include independent test reports, indicating compliance with specified requirements, including dosage rate used in test.

D. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances.

E. Research Reports:

1. For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.
2. For sheet vapor retarder/termite barrier, showing compliance with ICC AC380.

F. Preconstruction Test Reports: For each mix design.

G. Field quality-control reports.

H. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician or an ACI Concrete Flatwork Technician with experience installing and finishing concrete, incorporating permeability-reducing admixtures.

1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.

B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

- C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.
 - 1. Personnel performing laboratory tests shall be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.
- D. Field Quality Control Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
 - 1. Personnel conducting field tests shall be qualified as an ACI Concrete Field Testing Technician, Grade 1, in accordance with ACI CPP 610.1 or an equivalent certification program.
- E. Mockups: Cast concrete slab-on-ground and formed-surface panels to demonstrate typical joints, surface finish, texture, tolerances, floor treatments, and standard of workmanship.
 - 1. Slab-On-Ground: Build panel approximately 15 feet by 15 feet in the location indicated or, if not indicated, as directed by Architect. Not applicable per post-tension slab and component provider.
 - a. Divide panel into four equal panels to demonstrate saw joint cutting.
 - 2. Formed Surfaces: Build panel approximately 100 sq. ft. in the location indicated or, if not indicated, as directed by Architect.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.
 - 1. Include the following information in each test report:
 - a. Admixture dosage rates.
 - b. Slump.
 - c. Air content.
 - d. Seven-day compressive strength.
 - e. 28-day compressive strength.
 - f. Permeability.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and ACI 301.

1.9 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.
 - 1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 2. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - 3. Do not use frozen materials or materials containing ice or snow.

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4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
 5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

- A. Source Limitations:
1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
 2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
 3. Obtain aggregate from single source.
 4. Obtain each type of admixture from single source from single manufacturer.
- B. Cementitious Materials:
1. Portland Cement: ASTM C150/C150M, Type I.
 2. Fly Ash: ASTM C618, Class F.
- C. Normal-Weight Aggregates: ASTM C33/C33M, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.
1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D. Lightweight Aggregate: ASTM C330/C330M, 3/4-inch nominal maximum aggregate size.
- E. Air-Entraining Admixture: ASTM C260/C260M.
1. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 2. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 3. Retarding Admixture: ASTM C494/C494M, Type B.
 4. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
 5. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
 6. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
 7. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
 8. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C494/C494M, Type C.

- F. Water: ASTM C94/C94M, potable.

2.3 FIBER REINFORCEMENT

- A. Synthetic Macro-Fiber: Synthetic macro-fibers engineered and designed for use in concrete, complying with ASTM C1116/C1116M, Type III, 1 to 2-1/4 inches.

2.4 VAPOR RETARDERS

- A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A; not less than 15 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.

2.5 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
 - 1. Color:
 - a. Ambient Temperature Below 50 deg F: Black.
 - b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
 - c. Ambient Temperature Above 85 deg F: White.
- D. Water: Potable or complying with ASTM C1602/C1602M.
- E. Clear, Waterborne, Membrane-Forming, Nondissipating Curing Compound: ASTM C309, Type 1, Class B, certified by curing compound manufacturer to not interfere with bonding of floor covering.

2.6 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 in accordance with ASTM D2240.
- C. Bonding Agent: ASTM C1059/C1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.7 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 - 4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.

2.8 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
 - 1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash or Other Pozzolans: 25 percent by mass.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
 - 1. Use plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete,.
 - 4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.
 - 5. Use permeability-reducing admixture in concrete mixtures where indicated.

2.9 CONCRETE MIXTURES

- A. Class A: Normal-weight concrete used for footings, grade beams, and tie beams.
 - 1. Exposure Class: ACI 318 W1.
 - 2. Minimum Compressive Strength: 4000 psi at 28 days.
 - 3. Maximum w/cm: 0.40

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4. Slump Limit: 3 inches plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site.
 5. Slump Flow Limit: Plus or minus 2.5 inches.
 6. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- B. Class B: Normal-weight concrete used for foundation walls.
1. Exposure Class: ACI 318 W1.
 2. Minimum Compressive Strength: 4000 psi at 28 days.
 3. Maximum w/cm 0.40.
 4. Slump Limit: 3 inches plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site.
 5. Slump Flow Limit: Plus or minus 2.5 inches.
 6. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- C. Class C: Normal-weight concrete used for interior slabs-on-ground.
1. Exposure Class: ACI 318 W1.
 2. Minimum Compressive Strength: 4000 psi at 28 days.
 3. Maximum w/cm: 0.40.
 4. Minimum Cementitious Materials Content: 520 lb/cu. yd.
 5. Slump Limit: 3 inches plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site.
 6. Slump Flow Limit: Plus or minus 2.5 inches.
 7. Air Content:
 - a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
 8. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
 9. Synthetic Macro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of 5 lb/cu. yd.
- D. Class D: Normal-weight concrete used for interior suspended slabs.
1. Exposure Class: ACI 318 W1.
 2. Minimum Compressive Strength: 4000 psi at 28 days.
 3. Maximum w/cm: 0.40.
 4. Minimum Cementitious Materials Content: 520 lb/cu. yd.
 5. Slump Limit: 3 inches plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site.
 6. Slump Flow Limit: 22 inches, plus or minus 1.5 inches.
 7. Air Content:
 - a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
 8. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
 9. Synthetic Macro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of 5 lb/cu. yd.
- E. Class G: Normal-weight concrete used for building frame members.
1. Exposure Class: ACI 318 W1. SUBMIT FOR APPROVAL WHEN UTILIZED
 2. Minimum Compressive Strength: 4000 psi at 28 days.
 3. Maximum w/cm: 0.40.
 4. Slump Limit: 3 inches plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site.

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5. Slump Flow Limit: 22 inches, plus or minus 1.5 inches.
6. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

F. Class H: Normal-weight concrete used for building walls.

1. Exposure Class: ACI 318 W1.
2. Minimum Compressive Strength: 4000 psi at 28 days.
3. Maximum w/cm: 0.40.
4. Slump Limit: 3 inches plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site.
5. Slump Flow Limit: 22 inches, plus or minus 1.5 inches.
6. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

G. Class J: Normal-weight concrete used for exterior retaining walls.

1. Exposure Class: ACI 318 W1.
2. Minimum Compressive Strength: 4000 psi at 28 days.
3. Maximum w/cm: 0.40.
4. Slump Limit: 3 inches plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site.
5. Slump Flow Limit: 22 inches, plus or minus 1.5 inches.
6. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

2.10 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M, and furnish batch ticket information.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
 2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
1. Daily access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
 4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.
3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.4 INSTALLATION OF VAPOR RETARDER

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
 2. Face laps away from exposed direction of concrete pour.
 3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
 4. Lap joints 6 inches and seal with manufacturer's recommended tape.
 5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
 6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
 7. Protect vapor retarder during placement of reinforcement and concrete.
 - a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.

3.5 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
 2. Place joints perpendicular to main reinforcement.
 - a. Continue reinforcement across construction joints unless otherwise indicated.
 - b. Do not continue reinforcement through sides of strip placements of floors and slabs.
 3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 6. Space vertical joints in walls as indicated on Drawings. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
 7. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 8. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness, unless otherwise recommended by post-tension slab component supplier, as follows:

1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
- D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints:
1. Install dowel bars and support assemblies at joints where indicated on Drawings.
 2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.
- F. Dowel Plates: Install dowel plates at joints where indicated on Drawings.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
 2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301, but not to exceed the amount indicated on the concrete delivery ticket.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
1. If a section cannot be placed continuously, provide construction joints as indicated.
 2. Deposit concrete to avoid segregation.
 3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.

4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.
 - a. Do not use vibrators to transport concrete inside forms.
 - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
 - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
 - d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 1. Do not place concrete floors and slabs in a checkerboard sequence.
 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 3. Maintain reinforcement in position on chairs during concrete placement.
 4. Screed slab surfaces with a straightedge and strike off to correct elevations.
 5. Level concrete, cut high areas, and fill low areas.
 6. Slope surfaces uniformly to drains where required.
 7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
 8. Do not further disturb slab surfaces before starting finishing operations.

3.7 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. ACI 301 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
 - a. Patch voids larger than 1/2 inch deep.
 - b. Remove projections larger than 1 inch.
 - c. Tie holes do not require patching.
 - d. Surface Tolerance: ACI 117 Class D.
 - e. Apply to concrete surfaces.
2. ACI 301 Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.
 - a. Patch voids larger than 1/2 inch deep.
 - b. Remove projections larger than 1/4 inch.
 - c. Patch tie holes.
 - d. Surface Tolerance: ACI 117 Class B.
 - e. Locations: Apply to ALL concrete surfaces.
3. ACI 301 Surface Finish SF-3.0:
 - a. Patch voids larger than 1/2 inch deep.
 - b. Remove projections larger than 1/8 inch.
 - c. Patch tie holes.
 - d. Surface Tolerance: ACI 117 Class A.
 - e. Locations: Apply to concrete surfaces

B. Rubbed Finish: Apply the following to as cast surface finishes where indicated on Drawings:

1. Smooth-Rubbed Finish:
 - a. Perform no later than one day after form removal.

- b. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture.
- c. If sufficient cement paste cannot be drawn from the concrete by the rubbing process, use a grout made from the same cementitious materials used in the in-place concrete.
- d. Maintain required patterns or variances as shown on Drawings or to match mockups.

C. Related Unformed Surfaces:

- 1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
- 2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish:

- 1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
- 2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch in one direction.
- 3. Apply scratch finish to surfaces to receive concrete floor toppings and/or to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish:

- 1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
- 2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
- 3. Apply float finish to surfaces to receive trowel finish.

D. Trowel Finish:

- 1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
- 2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
- 3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
- 4. Do not add water to concrete surface.
- 5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
- 6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, or another thin-film-finish coating system
- 7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:
 - a. Slabs on Ground:
 - 1) Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.
 - b. Suspended Slabs:

- 1) Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated on Drawings. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.
1. Coordinate required final finish with Architect before application.
 2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
 2. Coordinate required final finish with Architect before application.

3.9 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

- A. Filling In:
1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
 2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
 3. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations:
1. Coordinate sizes and locations of concrete bases with actual equipment provided.
 2. Construct concrete bases 4 inches high unless otherwise indicated on Drawings, and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
 3. Minimum Compressive Strength: 4000 psi at 28 days.
 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
 5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
 6. Prior to pouring concrete, place and secure anchorage devices.
 - a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - b. Cast anchor-bolt insert into bases.
 - c. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.10 CONCRETE CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
 2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
 3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h before and during finishing operations.

B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:

1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
3. If forms remain during curing period, moist cure after loosening forms.
4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
 - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
 - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
 - c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
 - d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
 - e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 1) Recoat areas subject to heavy rainfall within three hours after initial application.
 - 2) Maintain continuity of coating and repair damage during curing period.

C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:

1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:
 - a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12-inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
 - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
 - b. Floors to Receive Curing Compound:
 - 1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Maintain continuity of coating, and repair damage during curing period.
 - 4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound

manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.

- c. Floors to Receive Curing and Sealing Compound:
 - 1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.11 TOLERANCES

- A. Conform to ACI 117.

3.12 JOINT FILLING

- A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least six month(s).
 - 2. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints.
- D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.13 CONCRETE SURFACE REPAIRS

- A. Defective Concrete:
 - 1. Repair and patch defective areas when approved by Architect.
 - 2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete.
 - a. Limit cut depth to 3/4 inch.
 - b. Make edges of cuts perpendicular to concrete surface.
 - c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
 - d. Fill and compact with patching mortar before bonding agent has dried.
 - e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.

- a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
 - b. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces:
 1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
 - a. Correct low and high areas.
 - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 3. After concrete has cured at least 14 days, correct high areas by grinding.
 4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
 - a. Finish repaired areas to blend into adjacent concrete.
 5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
 - a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - b. Feather edges to match adjacent floor elevations.
 6. Correct other low areas scheduled to remain exposed with repair topping.
 - a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
 - b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.
 - a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
 - b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
 - c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
 - d. Place, compact, and finish to blend with adjacent finished concrete.
 - e. Cure in same manner as adjacent concrete.
 8. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.
 - a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
 - b. Dampen cleaned concrete surfaces and apply bonding agent.
 - c. Place patching mortar before bonding agent has dried.
 - d. Compact patching mortar and finish to match adjacent concrete.
 - e. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.14 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.
- B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
1. Testing agency shall be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
 2. Testing agency shall immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
 3. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
 - a. Test reports shall include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
 - 1) Project name.
 - 2) Name of testing agency.
 - 3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
 - 4) Name of concrete manufacturer.
 - 5) Date and time of inspection, sampling, and field testing.
 - 6) Date and time of concrete placement.
 - 7) Location in Work of concrete represented by samples.
 - 8) Date and time sample was obtained.
 - 9) Truck and batch ticket numbers.
 - 10) Design compressive strength at 28 days.
 - 11) Concrete mixture designation, proportions, and materials.
 - 12) Field test results.
 - 13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
 - 14) Type of fracture and compressive break strengths at seven days and 28 days.
- C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.
- D. Inspections:
1. Headed bolts and studs.
 2. Verification of use of required design mixture.
 3. Concrete placement, including conveying and depositing.
 4. Curing procedures and maintenance of curing temperature.
 5. Verification of concrete strength before removal of shores and forms from beams and slabs.
 6. Batch Plant Inspections: On a random basis, as determined by Architect.
- E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M shall be performed in accordance with the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., nor less than once for each 150 cu. yd. of concrete, nor less than once for each 5,000 sq. ft. of surface area for slabs or walls.

- a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C143/C143M:
 - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests when concrete consistency appears to change.
3. Slump Flow: ASTM C1611/C1611M:
 - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete.
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C1064/C1064M:
 - a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
6. Unit Weight: ASTM C567/C567M fresh unit weight of structural lightweight concrete.
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C31/C31M:
 - a. Cast and laboratory cure two sets of four 6-inch by 12-inch cylinder specimens for each composite sample.
8. Compressive-Strength Tests: ASTM C39/C39M.
 - a. Test one set of three field-cured specimens at seven days and one set of two specimens at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests:
 - a. Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
 - b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.

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- 1) Acceptance criteria for concrete strength shall be in accordance with ACI 301 section 1.6.6.3.
 13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- F. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 48 hours of completion of floor finishing and promptly report test results to Architect.

3.15 PROTECTION

- A. Protect concrete surfaces as follows:
1. Protect from petroleum stains.
 2. Diaper hydraulic equipment used over concrete surfaces.
 3. Prohibit vehicles from interior concrete slabs.
 4. Prohibit use of pipe-cutting machinery over concrete surfaces.
 5. Prohibit placement of steel items on concrete surfaces.
 6. Prohibit use of acids or acidic detergents over concrete surfaces.
 7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
 8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION 033000

**SECTION 04 2000
UNIT MASONRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete block.
- B. Mortar and grout.
- C. Reinforcement and anchorage.

1.02 REFERENCE STANDARDS

- A. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2020.
- B. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2019 (Reapproved 2025).
- C. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2022.
- D. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2024.
- E. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2022.
- F. ASTM C91/C91M - Standard Specification for Masonry Cement; 2023.
- G. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
- 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; 2019a, with Editorial Revision.
- K. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2018.
- L. ASTM C476 - Standard Specification for Grout for Masonry; 2020.
- M. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

1.04 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

- 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, lightweight.
 - a. Hollow block, as indicated.
 - b. Exposed Faces: Manufacturer's standard color and texture where indicated.

2.02 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91/C91M, Type S.
- B. Portland Cement: ASTM C150/C150M, Type I.
 1. Not more than 0.60 percent alkali.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Mortar Aggregate: ASTM C144.
- E. Grout Aggregate: ASTM C404.
- F. Water: Clean and potable.

2.03 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
 1. Blok-Lok Limited: www.blok-lok.com/#sle.
 2. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 3. WIRE-BOND www.wirebond.com/#sle.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi), deformed billet bars; galvanized.
- C. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.
- D. Single Wythe Joint Reinforcement: ASTM A951/A951M.
 1. Type: Truss or ladder.
 2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M Class 3.

2.04 FLASHINGS

- A. Metal Flashing Materials: Copper, as specified in Section 04 2613.

2.05 MORTAR AND GROUT MIXING

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
 1. Masonry below grade and in contact with earth: Type S.
 2. Exterior, loadbearing masonry: Type S.
 3. Exterior, non-loadbearing masonry: Type S.
 4. Interior, loadbearing masonry: Type S.
 5. Interior, non-loadbearing masonry: Type S.
- B. Grout: ASTM C476; consistency required to fill completely volumes indicated 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.
- C. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.
- D. Mixing: Use mechanical batch mixer and comply with referenced standards.

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 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COLD AND HOT WEATHER REQUIREMENTS

- A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.
- B. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
- C. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

3.04 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 Masonry Units:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave.

3.05 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.
- F. Interlock intersections and external corners.
- G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- I. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.
- J. Isolate masonry partitions from vertical structural framing members with a control joint.
- K. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.06 REINFORCEMENT AND ANCHORAGE - GENERAL AND SINGLE WYTHE MASONRY

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.

- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Embed longitudinal wires of joint reinforcement in mortar joint with at least 5/8 inch mortar cover on each side.
- E. Lap joint reinforcement ends minimum 6 inches.

3.07 LINTELS

- A. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
 - 1. See Sheet S3.0 for reinforcing requirements.
 - 2. Do not splice reinforcing bars.
 - 3. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
 - 4. Place and consolidate grout fill without displacing reinforcing.
 - 5. Allow masonry lintels to attain specified strength before removing temporary supports.

3.08 GROUTED COMPONENTS

- A. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- B. Place and consolidate grout fill without displacing reinforcing.

3.09 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.

3.10 TOLERANCES

- A. Install masonry within the site tolerances found in TMS 402/602.
- B. Maximum Variation from Alignment of Columns: 1/4 inch.
- C. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- D. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- E. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- F. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.11 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

3.12 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 04 2613 MASONRY VENEER

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Clay facing brick.
- B. Mortar and grout.
- C. Reinforcement and anchorage.
- D. Flashings.
- E. Installation of lintels.
- F. Accessories.

1.02 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2023.
- C. ASTM C91/C91M - Standard Specification for Masonry Cement; 2023.
- D. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
- E. ASTM C150/C150M - Standard Specification for Portland Cement; 2020.
- F. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
- G. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale); 2022.
- H. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.
- I. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2018.
- J. ASTM C476 - Standard Specification for Grout for Masonry; 2020.
- K. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.
- L. BIA Technical Notes No. 28B - Brick Veneer/Cold-Formed Steel Framed Walls; 2025.
- M. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2017.
- N. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, and mortar.
- C. Samples: Submit four samples of facing brick units to illustrate color, texture, and extremes of color range.

1.04 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

1.06 FIELD CONDITIONS

- A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.
- B. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
- C. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

2.02 BRICK UNITS

- A. Manufacturers:
 - 1. Palmetto Brick Company; Face Brick; www.palmettobrick.com.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.
 - 1. Color and Texture: As indicated on Drawings.
 - 2. Nominal Size: Modular.
 - 3. Special Shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.

2.03 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91/C91M Type S.
- B. Portland Cement: ASTM C150/C150M, Type I.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Mortar Aggregate: ASTM C144.
- E. Grout Aggregate: ASTM C404.
- F. Water: Clean and potable.

2.04 REINFORCEMENT AND ANCHORAGE

- A. 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. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
 - 2. Vertical adjustment: Not less than 3-1/2 inches.
 - 3. 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.
 - 4. Manufacturers: See Structural Drawings.
 - a. Substitutions: See Section 01 6000 - Product Requirements.

2.05 FLASHINGS

- A. Combination Non-Asphaltic Flashing Materials - Stainless Steel:
 - 1. Stainless Steel/Polymer Fabric Flashing - Self-Adhering: ASTM A240/A240M; 3 mil type 304 stainless steel sheet bonded on inward facing side to a sheet of polymer fabric that has a clear adhesive with a removable release liner.
 - a. Manufacturers:
 - 1) Hohmann & Barnard, Inc; Mighty-Flash - SA: www.h-b.com/#sle.

- 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.
- C. Termination Bars: Stainless steel; compatible with membrane and adhesives.
 - 1. Manufacturers:
 - a. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- D. Lap Sealants and Tapes: As recommended by flashing manufacturer; compatible with membrane and adhesives.

2.06 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
 - 1. Manufacturers:
 - a. Blok-Lok Limited: www.blok-lok.com/#sle.
 - b. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - c. WIRE-BOND: www.wirebond.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.
 - 1. Manufacturers:
 - a. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - b. WIRE-BOND: www.wirebond.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- C. Weeps:
 - 1. Type: Polyester mesh.
 - 2. Color(s): As selected by Architect from manufacturer's full range.
 - 3. Manufacturers:
 - a. Blok-Lok Limited: www.blok-lok.com/#sle.
 - b. CavClear, a Division of Archovations Inc: www.cavclear.com/#sle.
 - c. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - d. Mortar Net Solutions; WeepVent: www.mortarnet.com/#sle.
 - e. WIRE-BOND: www.wirebond.com/#sle.
 - f. Substitutions: See Section 01 6000 - Product Requirements.
- D. 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.
 - a. Manufacturers:
 - 1) Advanced Building Products, Inc: www.advancedbuildingproducts.com/#sle.
 - 2) CavClear, a Division of Archovations Inc: www.cavclear.com/#sle.
 - 3) Mortar Net Solutions; MortarNet: www.mortarnet.com/#sle.
 - 4) Substitutions: See Section 01 6000 - Product Requirements.
- E. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.07 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 S.

- B. 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.
- C. Mixing: Use mechanical batch mixer and comply with referenced standards.

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 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 Masonry Units:
 - 1. Bond: Running.
 - 2. Mortar Joints: Concave.
- D. Brick Units:
 - 1. Bond: Running.
 - 2. Coursing: Three units and three mortar joints to equal 8 inches.
 - 3. Mortar Joints: Concave.

3.03 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- C. Remove excess mortar as work progresses.
- D. Interlock intersections and external corners.
- E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- G. Isolate top joint of masonry veneer from horizontal structural framing members or support angles with compressible joint filler.

3.04 WEEPS/CAVITY VENTS

- A. Install weeps in veneer walls at 24 inches on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.

3.05 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.

3.06 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Install horizontal joint reinforcement 16 inches on center.

- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Lap joint reinforcement ends minimum 6 inches.
- D. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 16 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.
- E. Seismic Reinforcement: Connect veneer anchors with continuous horizontal wire reinforcement before embedding anchors in mortar.

3.07 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 over fluid-applied or self-adhered air/vapor barriers over backing or per manufacturer's directions.
- C. Install flashing in accordance with manufacturer's instructions and BIA Technical Notes No. 7.
- D. Extend metal flashings through exterior face of masonry and terminate in an angled drip with hemmed edge. Install joint sealer below drip edge to prevent moisture migration under flashing.
- E. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

3.08 LINTELS

- A. Install loose steel lintels over openings.
- B. Maintain minimum 8 inch bearing on each side of opening.

3.09 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Size control joints as indicated on drawings; if not indicated, 3/4 inch wide and deep.

3.10 TOLERANCES

- A. Install masonry within the site tolerances found in TMS 402/602.
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.

3.11 CLEANING

- A. Remove excess mortar and mortar smears as work progresses.
- B. Replace defective mortar. Match adjacent work.

- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

3.12 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:

1.2 ACTION SUBMITTALS

- A. Product Data:

1. Roof deck.
2. Acoustical roof deck.
3. Composite floor deck.
4. Electrified cellular floor deck.
5. Noncomposite form deck.
6. Noncomposite vented form deck.

- B. Shop Drawings:

1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

- C. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
2. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.
3. Environmental Product Declaration (EPD): For each product.
4. Product Certificates: For indigenous materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each indigenous material.
5. Environmental Product Declaration: For each product.
6. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each regional material.
7. Environmental Product Declaration: For each product.
8. Environmental Product Declaration: For each product.
9. Third-Party Certifications: For each product.
10. Third-Party Certified Life Cycle Assessment: For each product.
11. Health Product Declaration (HPD): For each product.

12. Sourcing of Raw Materials: Corporate sustainability report for each manufacturer.

1.3 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Product Certificates: For each type of steel deck.
- C. Test and Evaluation Reports:
 1. Product Test Reports: For tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
 - a. Power-actuated mechanical fasteners.
 - b. Acoustical roof deck.
 2. Research Reports: For steel deck, from ICC-ES showing compliance with the building code.
- D. Field Quality-Control Submittals:
 1. Field quality-control reports.
- E. Qualification Statements: For **welding personnel and testing agency**.

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with SDI QA/QC and the following welding codes:
 1. AWS D1.1/D1.1M.
 2. AWS D1.3/D1.3M.
- B. Electrical Raceway Units: Provide UL-labeled cellular floor-deck units complying with UL 209 and listed in UL's "Electrical Construction Equipment Directory" for use with standard header ducts and outlets for electrical distribution systems.
- C. FM Approvals' RoofNav Listing: Provide steel roof deck evaluated by FM Approvals and listed in its "RoofNav" for Class 1 fire rating. Identify materials with FM Approvals Certification markings.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Store products in accordance with SDI MOC3. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to

avoid condensation.

1. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck in accordance with AISI S100.
- B. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Indicate design designations from UL's "Fire Resistance Directory" or from listings of another qualified testing agency.
- C. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than **25** percent.

2.2 ACCESSORIES

- A. Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, **No. 10** minimum diameter.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of **33,000 psi**, not less than **0.0359-inch** design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of **33,000 psi**, of same material and finish as deck, and of thickness and profile **indicated or recommended by SDI standards for overhang and slab depth**.
- G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.
- H. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.

- I. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, [0.0598 inch] [0.0747 inch] thick, with factory-punched hole of 3/8-inch minimum diameter.
- J. Shear Stud Connectors: ASTM A108, AISI C-1015 through C-1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.
- K. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.
- L. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck, with 3-inch- wide flanges and level or sloped recessed pans of 1-1/2-inch minimum depth. For drains, cut holes in the field.
- M. Galvanizing Repair Paint: **ASTM A780/A780M**.
- N. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories in accordance with SDI C, SDI NC, and SDI RD, as applicable; manufacturer's written instructions; and requirements in this Section.
- B. Install temporary shoring before placing deck panels if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
 - 1. Align cellular deck panels over full length of cell runs and align cells at ends of abutting panels.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install in accordance with deck manufacturer's written instructions.
- J. Shear Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using end welding of headed-stud shear connectors in accordance with AWS D1.1/D1.1M and manufacturer's written instructions.

3.3 INSTALLATION OF FLOOR DECK

- A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:
 - 1. Weld Diameter: **5/8 inch**, nominal.
 - 2. Weld Spacing:
 - a. Weld edge ribs of panels at each support. Space additional welds an average of **16 inches** apart, but not more than **18 inches** apart.
 - b. Space and locate welds as indicated.
 - 3. Weld Washers: Install weld washers at each weld location.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or **36 inches**, and as follows:
 - 1. Mechanically fasten with self-drilling, **No. 10** diameter or larger, carbon-steel screws.
 - 2. Mechanically clinch or button punch.
 - 3. Fasten with a minimum of **1-1/2-inch**- long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of **1-1/2 inches**, with end joints as follows:
 - 1. End Joints: **Lapped** .
- D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure in accordance with SDI recommendations unless otherwise indicated.
- E. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, in accordance with SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

- F. Electrified Cellular Floor Deck: Install cellular floor system with deck assembled from **units indicated**.
 - 1. Coordinate layout and installation of trench headers, preset inserts, duct fittings, and other components specified in Section 260539 "Underfloor Raceways for Electrical Systems" with installation of electrified cellular metal floor deck.
- G. Install piercing hanger tabs at **14 inches** apart in both directions, within **9 inches** of walls at ends, and not more than **12 inches** from walls at sides unless otherwise indicated.

3.4 REPAIR

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint in accordance with ASTM A780/A780M and manufacturer's written instructions.
- B. Repair Painting:
 - 1. Wire brush and clean rust spots, welds, and abraded areas on **both surfaces** of prime-painted deck immediately after installation, and apply repair paint.
 - 2. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
 - 3. Wire brushing, cleaning, and repair painting of bottom deck surfaces are included in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
 - 4. Wire brushing, cleaning, and repair painting of rust spots, welds, and abraded areas of both deck surfaces are included in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: **Owner will engage** a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
 - 1. Special inspections and qualification of welding special inspectors for cold-formed steel floor and roof deck in accordance with quality-assurance inspection requirements of SDI QA/QC.
 - a. Field welds will be subject to inspection.
 - 2. Steel decking will be considered defective if it does not pass tests and inspections.
 - 3. Shear Stud Connectors: In addition to visual inspection, test and inspect field-welded shear connectors in accordance with requirements in AWS D1.1/D1.1M for stud welding and as follows:
 - a. Perform bend tests if visual inspections reveal either a less-than-continuous

- 360-degree flash or welding repairs to any shear connector.
 - b. Conduct tests in accordance with requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors that are already tested.

- C. Prepare test and inspection reports.

END OF SECTION 053100

**SECTION 06 1000
ROUGH CARPENTRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Structural dimension lumber framing.
- B. Rough opening framing for doors, windows, and roof openings.
- C. Roofing nailers.
- D. Preservative treated wood materials.
- E. Miscellaneous framing and sheathing.
- F. Concealed wood blocking, nailers, and supports.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Setting anchors in concrete.
- B. Section 07 2500 - Weather Barriers: Water-resistive barrier over sheathing.
- C. Section 09 2116 - 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; 2009.
- 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. AWPA U1 - Use Category System: User Specification for Treated Wood; 2012.
- D. PS 20 - American Softwood Lumber Standard; 2010.
- E. SPIB (GR) - Grading Rules; 2014.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. Species: Southern Pine, unless otherwise indicated.
 - 2. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.
- B. Lumber fabricated from old growth timber is not permitted.

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. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16):
 - 1. Species: Southern Pine.
 - 2. Grade: No. 2.
- E. 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. Roof Sheathing: Oriented strand board wood structural panel; PS 2.
 1. Grade: Structural 1 Sheathing.
 2. Bond Classification: Exposure 1.
 3. Performance Category: 5/8 PERF CAT.
 4. Span Rating: 40/20.
 5. Edges: Square.
 6. Exposure Time: Sheathing will not delaminate or require sanding due to moisture absorption from exposure to weather for up to 500 days.
 7. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches and 24 inches on center, respectively.

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.
- B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
 1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing complying with ASTM A653/A653M.
- C. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.
 1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing complying with ASTM A653/A653M.

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.

PART 3 EXECUTION

3.01 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.

3.02 FRAMING INSTALLATION

- A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength.
- B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- C. Install structural members full length without splices unless otherwise specifically detailed.
- D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.
- E. Construct double joist headers at floor openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
- F. Provide bridging at joists in excess of 8 feet span as detailed. Fit solid blocking at ends of members.

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 metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- C. 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.
- D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- E. Provide the following specific non-structural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.
 - 3. Grab bars.
 - 4. Towel and bath accessories.
 - 5. Wall paneling and trim.

3.04 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

3.05 INSTALLATION OF CONSTRUCTION PANELS

- A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
 - 1. Nail panels to framing; staples are not permitted.

3.06 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.

END OF SECTION

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SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wall sheathing.
2. Roof sheathing.
3. Composite nail base insulated roof sheathing.
4. Subflooring.
5. Underlayment.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for plywood backing panels.
2. Section 072500 "Weather Barriers" for water-resistive barrier applied over wall sheathing.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5516.
4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated plywood.
2. Fire-retardant-treated plywood.

1.5 QUALITY ASSURANCE

- A. Mockups: Build mockups to set quality standards for materials and execution.

1. Build integrated mockups of exterior wall assembly, 150 sq. ft., incorporating backup wall construction, window, door frame and sill, ties and other penetrations, and flashing to demonstrate

crack and joint treatment and sealing of gaps, terminations, and penetrations of air-barrier sheathing assembly.

- a. Coordinate construction of mockups to permit inspection and testing of sheathing before external insulation and cladding are installed.
 - b. Include junction with roofing membrane, building corner condition, and foundation wall intersection.
 - c. If Architect determines mockups do not comply with requirements, reconstruct mockups until mockups are approved.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- B. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested according to ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 WOOD PANEL PRODUCTS

- A. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- B. Factory mark panels to indicate compliance with applicable standard.

2.3 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

- C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, and waterproofing.

2.4 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 - 1. Use treatment that does not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
 - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201/D3201M at 92 percent relative humidity. Use where exterior type is not indicated.
 - 4. Design Value Adjustment Factors: Treated lumber plywood shall be tested according to ASTM D5516 and design value adjustment factors shall be calculated according to ASTM D6305. Span ratings after treatment shall be not less than span ratings specified. For roof sheathing and where high-temperature fire-retardant treatment is indicated, span ratings for temperatures up to 170 deg F shall be not less than span ratings specified.
- C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
- E. Application: Treat plywood indicated on Drawings, and as applicable for the following:
 - 1. Roof and wall sheathing within 48 inches of fire walls.
 - 2. Roof sheathing.
 - 3. Subflooring and underlayment for raised platforms.

2.5 WALL SHEATHING

- A. Plywood Sheathing: Per Structural Schedule located on Plan Sheets and Framing Details.
 - 1. Span Rating: Not less than 16/0.
 - 2. Nominal Thickness: Not less than 19/32 inch.
- B. Oriented-Strand-Board Sheathing: DOC PS 2, Exposure 1, Structural I sheathing.
 - 1. Span Rating: Not less than 16/0.
 - 2. Nominal Thickness: Not less than 19/32 inch.

2.6 ROOF SHEATHING

- A. Plywood Sheathing: Exterior, Structural I sheathing.
 - 1. Span Rating: Not less than 24/0.

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2. Nominal Thickness: Not less than 5/8 inch.

B. Oriented-Strand-Board Sheathing: DOC PS 2, Exposure 1, Structural I sheathing.

1. Span Rating: Not less than 24/16.
2. Nominal Thickness: Not less than 5/8 inch.

2.7 COMPOSITE NAIL BASE INSULATED ROOF SHEATHING

A. Oriented-Strand-Board-Surfaced, Polyisocyanurate-Foam Sheathing: ASTM C1289, Type V with DOC PS 2, Exposure 1 oriented strand board on one face.

1. Polyisocyanurate-Foam Thickness: 4 inches.
2. Oriented-Strand-Board Nominal Thickness: 5/8 inch.

2.8 SUBFLOORING AND UNDERLAYMENT

A. Plywood Combination Subfloor-Underlayment: DOC PS 1, Exposure 1, Structural I, Underlayment single-floor panels.

1. Span Rating: Not less than 16.
2. Nominal Thickness: Not less than 23/32 inch.
3. Edge Detail: Tongue and groove.
4. Surface Finish: Fully sanded face.

B. Oriented-Strand-Board Combination Subfloor-Underlayment: DOC PS 2, Exposure 1 single-floor panels.

1. Span Rating: Not less than 16.
2. Nominal Thickness: Not less than 23/32 inch.
3. Edge Detail: Tongue and groove.
4. Surface Finish: Resin-impregnated overlay face.

C. Plywood Subflooring: Exterior, Structural I single-floor panels or sheathing.

1. Span Rating: Not less than 16.
2. Nominal Thickness: Not less than 23/32 inch.

D. Oriented-Strand-Board Subflooring: DOC PS 2, Exposure 1, Structural I sheathing.

1. Span Rating: Not less than 16
2. Nominal Thickness: Not less than 23/32 inch.

2.9 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.
2. For wall sheathing, provide fasteners with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B117.

B. Nails: ASTM F1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

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- D. Screws for Fastening Sheathing to Wood Framing: ASTM C1002.

2.10 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Panels to Wood Framing: Formulation complying with APA AFG-01 or ASTM D3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
 - 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
 - 3. ICC-ES evaluation report for fastener.
- D. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.
- E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Combination Subfloor-Underlayment:
 - a. Glue and screw to wood framing per Structural Schedule located on Plan Sheets and Framing Details.
 - b. Space panels 1/8 inch apart at edges and ends.
 - 2. Subflooring:

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- a. Glue and screw to wood framing per Structural Schedule located on Plan Sheets and Framing Details.
 - b. Space panels 1/8 inch apart at edges and ends.
- 3. Wall and Roof Sheathing:
 - a. Nail to wood framing.
 - b. Space panels 1/8 inch apart at edges and ends.

END OF SECTION 061600

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SECTION 061753 - SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wood roof trusses.
2. Wood floor trusses.
3. Wood girder trusses.

B. Related Requirements:

1. Section 313116 "Termite Control" for site application of borate treatment to wood trusses.

1.2 DEFINITIONS

- A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For fire-retardant-treated lumber, metal-plate connectors, metal truss accessories, and fasteners.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification from treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification from treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to truss fabricator.

- B. Shop Drawings: Show fabrication and installation details for trusses.

1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
2. Indicate sizes, stress grades, and species of lumber.
3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
6. Show splice details and bearing details.

- C. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

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1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For metal connector-plate manufacturer, professional engineer, and fabricator.
- B. Material Certificates: For dimension lumber specified to comply with minimum specific gravity. Indicate species and grade selected for each use and specific gravity.
- C. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss-fabricating firm.
- D. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preservative-treated lumber.
 - 2. Fire-retardant-treated wood.
 - 3. Metal-plate connectors.
 - 4. Metal truss accessories.

1.5 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
 - 1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
 - 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
- B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program, complies with quality-control procedures in TPI 1, and involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.
- C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
 - 1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
 - 2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
 - 3. Provide for air circulation around stacks and under coverings.
- B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal-plate-connected wood trusses.

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- B. Structural Performance: Metal-plate-connected wood trusses shall be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.
 - 1. Design Loads: As indicated.
 - 2. Maximum Deflection under Design Loads:
 - a. Roof Trusses: Vertical deflection of $L/400$ of span.
 - b. Floor Trusses: Vertical deflection of $L/600$ of span.
- C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.
- D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

2.2 DIMENSION LUMBER

- A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
 - 3. Provide dressed lumber, S4S.
 - 4. Provide dry lumber with 15 percent maximum moisture content at time of dressing.
- B. Minimum Chord Size for Roof Trusses: 2 by 6 inches nominal for both top and bottom chords.
- C. Minimum Specific Gravity for Top Chords: 0.50
- D. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 061000 "Rough Carpentry."

2.3 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
 - 2. For exposed trusses indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
 - 1. For exposed trusses indicated to receive a stained or natural finish, omit marking and provide certificates of treatment compliance issued by inspection agency.
- D. Application: Treat trusses where indicated on Drawings.

2.4 FIRE-RETARDANT-TREATED WOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products according to test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 - 1. Use treatment that does not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
 - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use for interior locations where exterior type is not indicated.
 - 4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D5664, and design value adjustment factors shall be calculated according to ASTM D6841. For enclosed roof framing and framing in attic spaces, and where high-temperature fire-retardant treatment is indicated, provide material with adjustment factors of not less than 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. For exposed trusses and bracing indicated to receive a stained or natural finish, omit marking and provide certificates of treatment compliance issued by inspection agency.
- E. For exposed trusses indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
- F. Application: Treat items indicated on Drawings, and the following:
 - 1. Floor trusses.
 - 2. Roof trusses.

2.5 METAL CONNECTOR PLATES

- A. Fabricate connector plates to comply with TPI 1.
- B. Hot-Dip Galvanized-Steel Sheet: ASTM A653/A653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 coating designation; and not less than 0.036 inch thick.
 - 1. Use for interior locations unless otherwise indicated.
- C. Hot-Dip Heavy-Galvanized-Steel Sheet: ASTM A653/A653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.
 - 1. Use for wood-preservative-treated lumber and where indicated.

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- D. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, and not less than 0.035 inch thick.
 - 1. Use for exterior locations, fire-retardant treated lumber, and where indicated.

2.6 FASTENERS

- A. Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
 - 2. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M
- B. Nails, Brads, and Staples: ASTM F1667.

2.7 METAL FRAMING ANCHORS AND ACCESSORIES

- A. Allowable design loads, as published by manufacturer, shall comply with or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.
- B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 coating designation.
 - 1. Use for interior locations unless otherwise indicated.
- C. Hot-Dip Heavy-Galvanized-Steel Sheet: ASTM A653/A653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.
 - 1. Use for wood-preservative-treated lumber and where indicated.
- D. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304.
 - 1. Use for exterior locations and where indicated.
- E. Truss Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening roof trusses to wall studs below, 2-1/2 inches wide by 0.062 inch thick. Tie fits over top of truss and fastens to both sides of truss, inside face of top plates, and both sides of stud below.
- F. Roof Truss Clips: Angle clips for bracing bottom chord of roof trusses at non-load-bearing walls, 1-1/4 inches wide by 0.050 inch thick. Clip is fastened to truss through slotted holes to allow for truss deflection.
- G. Floor Truss Hangers: U-shaped hangers, full depth of floor truss, with 1-3/4-inch- long seat; formed from metal strap 0.062 inch thick with tabs bent to extend over and be fastened to supporting member.
- H. Roof Truss Bracing/Spacers: U-shaped channels, 1-1/2 inches wide by 1 inch deep by 0.040 inch thick, made to fit between two adjacent trusses and accurately space them apart, and with tabs having metal teeth for fastening to trusses.
- I. Drag Strut Connectors: Angle clip with one leg extended for fastening to the side of girder truss.

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1. Angle clip is 3 by 3 by 0.239 by 10-1/2 inches with extended leg 10-1/2 inches long. Connector has galvanized finish.

2.8 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing a minimum of 92 percent zinc dust by weight.

2.9 FABRICATION

- A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.
- B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.
- C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
 1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

2.10 SOURCE QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections.
 1. Provide special inspector with access to fabricator's documentation of detailed fabrication and quality-control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards.
 2. Provide special inspector with access to places where wood trusses are being fabricated to perform inspections.
- B. Correct deficiencies in Work that special inspections indicate do not comply with the Contract Documents.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.

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- F. Space trusses 19.2 inches o.c. minimum or as indicated; adjust and align trusses in location before permanently fastening. Spacing may be modified at mechanical chases and fortified by truss manufacturer. Maximum of 24" o.c. spacing.
- G. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- H. Securely connect each truss ply required for forming built-up girder trusses.
 - 1. Anchor trusses to girder trusses as indicated.
- I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
 - 1. Install bracing to comply with Section 061000 "Rough Carpentry."
 - 2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.
- J. Install wood trusses within installation tolerances in TPI 1.
- K. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
- L. Replace wood trusses that are damaged or do not comply with requirements.
 - 1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.

3.2 REPAIRS AND PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- C. Repair damaged galvanized coatings on exposed surfaces according to ASTM A780/A780M and manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections to verify that temporary installation restraint/bracing and the permanent individual truss member restraint/bracing are installed in accordance with the approved truss submittal package.

END OF SECTION 061753

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SECTION 061800 - GLUED-LAMINATED CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing using structural glued-laminated timber.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for dimension lumber items associated with structural glued-laminated timber.

1.2 DEFINITIONS

- A. Structural Glued-Laminated (Glulam) Timber: An engineered, stress-rated timber product assembled from selected and prepared wood laminations bonded together with adhesives and with the grain of the laminations approximately parallel longitudinally.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data on lumber, adhesives, fabrication, and protection.
2. For preservative-treated wood products. Include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
3. For connectors. Include installation instructions.

B. Shop Drawings:

1. Show layout of structural glued-laminated timber system and full dimensions of each member.
2. Indicate species and laminating combination.
3. Include large-scale details of connections.

- C. Samples: Full width and depth, 24 inches long, showing the range of variation to be expected in appearance of structural glued-laminated timber including variations due to specified treatment.

- D. Delegated-Design Submittal: For structural glued-laminated timber and timber connectors.

1.4 INFORMATIONAL SUBMITTALS

- A. Certificates of Conformance: Issued by a qualified testing and inspecting agency indicating that structural glued-laminated timber complies with requirements in AITC A190.1.

- B. Material Certificates: For preservative-treated wood products, from manufacturer. Indicate type of preservative used and net amount of preservative retained.

- C. Research/Evaluation Reports: For structural glued-laminated timber and timber connectors, from ICC-ES.

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1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: An AITC- or APA-EWS-licensed firm.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with provisions in AITC 111.
- B. Individually wrap members using plastic-coated paper covering with water-resistant seams.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design structural glued-laminated timber and connectors.
- B. Structural Performance: Structural glued-laminated timber and connectors shall withstand the effects of structural loads shown on Drawings without exceeding allowable design working stresses listed in AITC 117 or determined according to ASTM D3737 and acceptable to authorities having jurisdiction.
- C. Seismic Performance: Structural glued-laminated timber and connectors shall withstand the effects of earthquake motions determined according to ASCE7-10/SEI 7.

2.2 STRUCTURAL GLUED-LAMINATED TIMBER

- A. General: Provide structural glued-laminated timber that complies with AITC A190.1 and AITC 117 or research/evaluation reports acceptable to authorities having jurisdiction.
 - 1. Factory mark each piece of structural glued-laminated timber with AITC Quality Mark or APA-EWS trademark. Place mark on surfaces that are not exposed in the completed Work.
 - 2. Provide structural glued-laminated timber made from single species.
 - 3. Provide structural glued-laminated timber made from solid lumber laminations; do not use laminated veneer lumber.
 - 4. Provide structural glued-laminated timber made with wet-use adhesive complying with AITC A190.1.
- B. Species and Grades for Structural Glued-Laminated Timber: Southern pine in grades needed to comply with "Performance Requirements" Article.
- C. Species and Grades for Structural Glued-Laminated Timber: Southern pine that complies with structural properties / beam stress classifications indicated.
- D. Species and Grades for Beams:
 - 1. Species and Beam Stress Classification: Southern pine, 30F-2.1E
 - 2. Lay-up: Balanced
- E. Species and Grades for Arches:
 - 1. Species and Beam Stress Classification: Southern pine, 24F-1.9E
 - 2. Lay-up: Balanced.

3. Species and Combination Symbol: Southern pine, 24F-V3 SP.

F. Species and Grades for Columns:

1. Species and Combination Symbol Southern pine, 50.

G. Appearance Grade:

1. Exposed Columns: Architectural Grade, fill voids as required by AITC 110.
2. Concealed Members: Framing Grade, complying with AITC 110.

2.3 PRESERVATIVE TREATMENT

A. Preservative Treatment: Where preservative-treated structural glued-laminated timber is indicated, comply with AWP A U1, Use Category 3B.

1. Use preservative solution without water repellents or substances that might interfere with application of indicated finishes.
2. Do not incise structural glued-laminated timber or wood used to produce structural glued-laminated timber.

B. Preservative: One of the following:

1. Oxine copper (copper-8-quinolinolate) in a light petroleum solvent.
2. Pentachlorophenol in light petroleum solvent.
3. Copper naphthenate in a light petroleum solvent.
4. Ammoniacal zinc copper arsenate (ACZA) in a water solution.
5. Chromated copper arsenate (CCA) in a water solution.
6. Ammoniacal copper quat Type A (ACQ-C) in a water solution.
7. Propiconazole tebuconazole imidacloprid (PTI) in a water emulsion.

C. After dressing members, apply a copper naphthenate field-treatment preservative to comply with AWP A M4 to surfaces cut to a depth of more than 1/16 inch.

2.4 TIMBER CONNECTORS

- A. Fabricate beam seats from structural fiberglass per Engineering Documents.
- B. Fabricate arch base shoes from steel with 1-inch baseplates and 3/8-inch side plates.
- C. Fabricate beam hangers from steel with 0.179-inch stirrups and 0.239-inch top plates.
- D. Fabricate hinge connectors from structural fiberglass per Engineering Documents with 0.179-inch side plates and 1-inch top and bottom plates.
- E. Fabricate strap ties from structural fiberglass per Engineering Documents, 5 inches wide by 0.375 inch thick.
- F. Fabricate tie rods from round steel bars with upset threads connected with forged-steel turnbuckles complying with ASTM A668/A668M.

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- G. Provide bolts, 3/4 inch unless otherwise indicated, complying with ASTM A307, Grade A; nuts complying with ASTM A563; and, where indicated, flat washers.
- H. Provide shear plates, 2-5/8 inches in diameter, complying with ASTM D5933.
- I. Materials: Unless otherwise indicated, fabricate from the following materials:
 - 1. Structural-steel shapes, plates, and flat bars complying with ASTM A36/A36M.
 - 2. Round steel bars complying with ASTM A575, Grade M 1020.
 - 3. Hot-rolled steel sheet complying with ASTM A1011/A1011M, Structural Steel, Type SS, Grade 33.
 - 4. Stainless steel flat bars complying with ASTM A666, Type 304.
 - 5. Stainless steel bars and shapes complying with ASTM A276, Type 304.
 - 6. Stainless steel plate, sheet, and strip complying with ASTM A240/A240M or ASTM A666, Type 304.
- J. Finish steel assemblies and fasteners with rust-inhibitive primer, 2-mil dry film thickness.
- K. Hot-dip galvanize steel assemblies and fasteners after fabrication to comply with ASTM A123/A123M or ASTM A153/A153M.

2.5 MISCELLANEOUS MATERIALS

- A. End Sealer: Manufacturer's standard, transparent, colorless wood sealer that is effective in retarding the transmission of moisture at cross-grain cuts and is compatible with indicated finish.
- B. Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer that is compatible with indicated finish.

2.6 FABRICATION

- A. Shop fabricate for connections to greatest extent possible, including cutting to length and drilling bolt holes.
 - 1. Dress exposed surfaces as needed to remove planing and surfacing marks.
- B. Camber: Fabricate horizontal and inclined members of less than 1:1 slope with either circular or parabolic camber equal to 1/500 of span.
- C. Where preservative-treated members are indicated, fabricate (cut, drill, surface, and sand) before treatment to greatest extent possible. Where fabrication must be done after treatment, apply a field-treatment preservative to comply with AWWPA M4.
 - 1. Use inorganic boron (SBX) treatment for members not in contact with the ground and continuously protected from liquid water.
 - 2. Use copper naphthenate treatment for members in contact with the ground or not continuously protected from liquid water.
- D. End-Cut Sealing: Immediately after end cutting each member to final length and after preservative treatment, apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood coated for not less than 10 minutes.
- E. Seal Coat: After fabricating, sanding, and end-coat sealing, apply a heavy saturation coat of penetrating sealer on surfaces of each unit except for preservative-treated wood where treatment included a water repellent.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates in areas to receive structural glued-laminated timber, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Erect structural glued-laminated timber true and plumb and with uniform, close-fitting joints. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.
 - 1. Handle and temporarily support glued-laminated timber to prevent surface damage, compression, and other effects that might interfere with indicated finish.
- B. Framing Built into Masonry: Provide 1/2-inch clearance at tops, sides, and ends of members built into masonry; bevel cut ends 3 inches; and do not embed more than 4 inches unless otherwise indicated.
- C. Cutting: Avoid extra cutting after fabrication. Where field fitting is unavoidable, comply with requirements for shop fabrication.
- D. Fit structural glued-laminated timber by cutting and restoring exposed surfaces to match specified surfacing and finishing.
 - 1. Predrill for fasteners using timber connectors as templates.
 - 2. Finish exposed surfaces to remove planing or surfacing marks and to provide a finish equivalent to that produced by machine sanding with No. 120 grit sandpaper.
 - 3. Coat cross cuts with end sealer.
 - 4. Where preservative-treated members must be cut during erection, apply a field-treatment preservative to comply with AWP A M4.
 - a. Use inorganic boron (SBX) treatment for members not in contact with the ground and continuously protected from liquid water.
 - b. Use copper naphthenate treatment for members in contact with the ground or not continuously protected from liquid water.
- E. Install timber connectors as indicated.
 - 1. Unless otherwise indicated, install bolts with same orientation within each connection and in similar connections.
 - 2. Install bolts with orientation as indicated or, if not indicated, as directed by Architect.

3.3 ADJUSTING

- A. Repair damaged surfaces and finishes after completing erection. Replace damaged structural glued-laminated timber if repairs are not approved by Architect.

3.4 PROTECTION

- A. Do not remove wrappings on individually wrapped members until they no longer serve a useful purpose, including protection from weather, sunlight, soiling, and damage from work of other trades.

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1. Coordinate wrapping removal with finishing work. Retain wrapping where it can serve as a painting shield.
2. Slit underside of wrapping to prevent accumulation of moisture inside the wrapping.

END OF SECTION 061800

SECTION 06 4100
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Specially fabricated cabinet units.
- B. Hardware.
- C. Factory finishing.
- D. Preparation for installing utilities.

1.02 RELATED REQUIREMENTS

- A. Section 12 3600 - Countertops.

1.03 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; 2016.
- C. BHMA A156.9 - American National Standard for Cabinet Hardware; 2010.
- D. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- E. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
 - 1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
 - 2. Provide the information required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
- C. Product Data: Provide data for hardware accessories.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from moisture damage.

1.07 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.

2.02 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.

2.03 LAMINATE MATERIALS

- A. Manufacturers:

1. Wilsonart LLC; Decorative Plastic Laminates: www.wilsonart.com/#sle.
 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.

2.04 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Plastic Edge Banding: Extruded PVC, convex shaped; smooth finish; self locking serrated tongue; of width to match component thickness.
 1. Color: As selected by Architect from manufacturer's full range.
 2. Use at all exposed shelf edges.
- 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.
- F. Grommets: Standard plastic, painted metal, or rubber grommets for cut-outs, in color to match adjacent surface. Furnish and install one grommet per work station as shown on the Furniture and Equipment Plan.

2.05 HARDWARE

- A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
- B. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards or multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch spacing adjustments. The use of plastic shelf supports is prohibited.
- C. Drawer and Door Pulls: "U" shaped wire pull, steel with chrome finish, 4 inch centers.
- D. Catches: Magnetic.
- E. Drawer Slides:
 1. Type: Extension types as indicated.
 2. Static Load Capacity: Heavy Duty grade.
 3. Mounting: Side mounted.
 4. Stops: Integral type.
 5. Features: Provide self closing/stay closed type.
- F. Hinges: European style concealed self-closing type, steel with polished finish.

2.06 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. 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.

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. Install work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- C. Use fixture attachments in concealed locations for wall mounted components.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units.
- E. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- F. Secure cabinets to floor using appropriate angles and anchorages.

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 06 8316
FIBERGLASS REINFORCED PANELING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fiberglass reinforced plastic (FRP) panels.
- B. Trim.

1.02 REFERENCE STANDARDS

- A. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2010 (Reapproved 2018).
- B. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- C. ASTM D5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels; 2022.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

1.03 SUBMITTALS

- A. See Section 01 3000 - 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. Samples: Submit two samples 12 by 12 inch in size illustrating material and surface design of panels.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Store panels flat, indoors, on a clean, dry surface. Remove packaging and allow panels to acclimate to room temperature for 48 hours prior to installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fiberglass Reinforced Plastic Panels:
 - 1. Marlite, Inc; Symmetrix Smart Seam: www.marlite.com/#sle.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PANEL SYSTEMS

- A. Wall Panels:
 - 1. Panel Size: 4 by 8 feet.
 - 2. Panel Thickness: 3/32 inch.
 - 3. Surface Design: Smooth; SmartSeam Rectangle; Skinny Horizontal Configuration.
 - 4. Color: White.
 - 5. Attachment Method: Adhesive only, with trim and sealant in joints.

2.03 MATERIALS

- A. Panels: Fiberglass reinforced plastic (FRP), complying with ASTM D5319.
 - 1. Surface Burning Characteristics: Maximum flame spread index of 200 and smoke developed index of 450; when system tested in accordance with ASTM E84.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 3. Impact Strength: Greater than 6 ft lb force per inch, when tested in accordance with ASTM D256.
- B. Trim: Aluminum; Satin Anodized.

- C. Sealant: Type recommended by panel manufacturer; white.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions and substrate flatness before starting work.
- B. Verify that substrate conditions are ready to receive the work of this section.

3.02 INSTALLATION - WALLS

- A. Install panels in accordance with manufacturer's instructions.
- B. Cut and drill panels with carbide tipped saw blades, drill bits, or snips.
- C. Apply adhesive to the back side of the panel using trowel as recommended by adhesive manufacturer.
- D. Apply panels to wall with seams plumb and pattern aligned with adjoining panels.
- E. Install panels with manufacturer's recommended gap for panel field and corner joints.
- F. Place trim on panel before fastening edges, as required.
- G. Fill channels in trim with sealant before attaching to panel.
- H. Install trim with adhesive and screws or nails, as required.
- I. Seal gaps at floor, ceiling, and between panels with applicable sealant to prevent moisture intrusion.
- J. Remove excess sealant after paneling is installed and prior to curing.

END OF SECTION

**SECTION 07 0553
FIRE AND SMOKE ASSEMBLY IDENTIFICATION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Identification markings for fire partitions and fire rated walls.

1.02 RELATED REQUIREMENTS

- A. Section 09 9123 - INTERIOR PAINTING: Paint finish.

1.03 REFERENCE STANDARDS

- A. ICC (IBC) - International Building Code; 2015.

1.04 FIELD CONDITIONS

- A. Do not install painted markings when ambient temperature is lower than recommended by coating manufacturer.

PART 2 PRODUCTS

2.01 FIRE AND SMOKE ASSEMBLY IDENTIFICATION

- A. Regulatory Requirements: Comply with "Marking and Identification" requirements of "Fire-Resistance Ratings and Fire Tests" chapter of ICC (IBC).
- B. Languages: Provide sign markings in English.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

3.02 PREPARATION

- A. See Section 09 9123 for substrate preparation for painted markings.

3.03 INSTALLATION

- A. Locate markings as required by ICC (IBC).
- B. Install neatly, with horizontal edges level.
- C. Protect from damage until Date of Substantial Completion; repair or replace damaged markings.

END OF SECTION

**SECTION 07 1113
BITUMINOUS DAMPPROOFING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Bituminous dampproofing.
- B. Protection boards.

1.02 RELATED REQUIREMENTS

- A. Section 07 2100 - Thermal Insulation: Rigid insulation board used as protection board.

1.03 REFERENCE STANDARDS

- A. ASTM D41/D41M - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing; 2011 (Reapproved 2016).
- B. ASTM D1227/D1227M - Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing; 2013, with Editorial Revision (2019).
- C. NRCA (WM) - The NRCA Waterproofing Manual; 2021.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide properties of primer, bitumen, and mastics.
- C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with at least three years of experience.

1.06 FIELD CONDITIONS

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application until dampproofing has cured.

PART 2 PRODUCTS

2.01 BITUMINOUS DAMPPROOFING

- A. Bituminous Dampproofing: Cold-applied water-based emulsion; asphalt with mineral colloid or chemical emulsifying agent; with or without fiber reinforcement; asbestos-free; suitable for application on vertical and horizontal surfaces.
 - 1. Emulsified Asphalt: ASTM D1227/D1227M, Type II, Class 1 - Mineral colloid emulsifying agents with non-asbestos fibers.
 - 2. VOC Content: Not more than permitted by local, State, and federal regulations.
 - 3. Applied Thickness: 1/16 inch, minimum, wet film.
 - 4. Products:
 - a. Karnak Corporation; 220 Fibered Emulsion Dampproofing: www.karnakcorp.com/#sle.
 - b. W. R. Meadows, Inc; Sealmastic Emulsion Type I (spray-grade): www.wrmeadows.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- B. Primers, Mastics, and Related Materials: Type as recommended by dampproofing manufacturer.

2.02 BITUMEN MATERIALS

- A. Cold Asphaltic Type:
 - 1. Emulsified Asphalt: ASTM D1227/D1227M, with fiber reinforcement other than asbestos, Type II, Class 1 or 2.
 - 2. Asphalt Primer: ASTM D41/D41M, compatible with substrate.

2.03 ACCESSORIES

- A. Protection Board: Rigid insulation; see Section 07 2100.

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 dampproofing system.
- C. Verify that items penetrating surfaces to receive dampproofing are securely installed.

3.02 PREPARATION

- A. Protect adjacent surfaces not designated to receive dampproofing.
- B. Clean and prepare surfaces to receive dampproofing in accordance with manufacturer's instructions.
- C. Do not apply dampproofing to surfaces unacceptable to manufacturer.
- D. Apply mastic to seal penetrations, small cracks, or minor honeycombs in substrate.

3.03 APPLICATION

- A. Foundation Walls: Apply two coats of asphalt dampproofing.
- B. Perform this work in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
- C. Prime surfaces in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
- D. Prime surfaces at a rate approved by manufacturer for application indicated, and allow primer to dry thoroughly.
- E. Apply bitumen by spray application.
- F. Apply bitumen at a temperature limited by equiviscous temperature (EVT) plus or minus 25 degrees F; do not exceed finish blowing temperature for four hours.
- G. Apply bitumen in one coat, continuous and uniform, at a rate of 25 sq ft/gal per coat.
- H. Apply from 2 inches below finish grade elevation down to top of footings.
- I. Seal items watertight with mastic, that project through dampproofing surface.
- J. Immediately backfill against dampproofing to protect from damage.
- K. Place protection board directly over dampproofing, butt joints, and adhere to tacky dampproofing.
- L. Scribe and cut boards around projections, penetrations, and interruptions.

END OF SECTION

SECTION 07 2100 THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Batt insulation in exterior wall, ceiling, and roof construction.
- B. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.02 RELATED REQUIREMENTS

- A. Section 07 5400 - Thermoplastic Membrane Roofing: Installation requirements for board insulation over low slope roof deck.

1.03 REFERENCE STANDARDS

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2015a.
- B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- D. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C; 2019a.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

1.05 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 in Metal Framed Walls: Batt insulation with separate vapor retarder.
- B. Insulation in Wood Framed Ceiling Structure: Batt insulation with integral vapor retarder.

2.02 MINERAL FIBER BLANKET INSULATION MATERIALS

- A. Flexible Glass Fiber Blanket Thermal Insulation: Preformed insulation, complying with ASTM C665; friction fit.
 - 1. Flame Spread Index: 25 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. Facing: Aluminum foil, flame spread 25 rated; one side.
 - 5. Products:
 - a. CertainTeed Corporation: www.certainteed.com/#sle.
 - b. Johns Manville: www.jm.com/#sle.
 - c. Owens Corning Corporation: www.ocbuildingspec.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.03 ACCESSORIES

- A. 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 BATT INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions.
- B. Install in exterior wall and ceiling 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. Tape insulation batts in place.
- F. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

3.03 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 2500 WEATHER BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Air Barriers: Materials that form a system to stop passage of air through exterior walls, joints between exterior walls and roof, joints around frames of openings in exterior walls, and ____.

1.02 DEFINITIONS

- A. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.

1.03 REFERENCE STANDARDS

- A. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2020.
- B. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on material characteristics.

1.05 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES

- A. Air Barrier:
 - 1. On outside surface of inside wythe of exterior masonry cavity walls use air barrier coating, fluid applied type.
 - 2. On outside surface of sheathing of exterior walls use air barrier coating, fluid applied type.

2.02 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

- A. Air Barrier, Fluid Applied: Vapor permeable, elastomeric waterproofing.
 - 1. Air Barrier Coating:
 - a. Dry Film Thickness (DFT): 40 mils, 0.040 inch, minimum.
 - b. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
 - c. Water Vapor Permeance: 25 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure B (Water Method) at 73.4 degrees F.
 - d. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to nine months of weather exposure after application.
 - e. Elongation: 300 percent, minimum, when tested in accordance with ASTM D412.
 - f. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 - g. VOC Content: 100 g per L or less.
 - h. Sealants, Tapes and Accessories: As recommended by coating manufacturer.
 - i. Manufacturers:

- 1) DuPont de Nemours, Inc; Tyvek Fluid Applied WB+ with Tyvek Fluid Applied Flashing and Joint Compound, Sealant for Tyvek Fluid Applied System, and StraightFlash: building.dupont.com/#sle.
- 2) Substitutions: See Section 01 6000 - Product Requirements.

2.03 ACCESSORIES

- A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.
- B. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials.
 1. Application: Apply at 30 to 40 mil, 0.030 to 0.40 inch nominal thickness.
 2. Color: Green.
- C. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.
 1. Composition: Butyl rubber sheet laminated to elasticized polyethylene sheet.
 2. Thickness: 70 mil, 0.070 inch, nominal.
 3. Manufacturers:
 - a. DuPont de Nemours, Inc; DuPont StraightFlash: building.dupont.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept the work of this section.

3.02 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive adhesives in accordance with manufacturer's instructions.

3.03 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- C. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.
- D. Coatings:
 1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
 2. Where exterior masonry veneer is to be installed, install masonry anchors before installing weather barrier over masonry; seal around anchors air tight.
 3. Use flashing to seal to adjacent construction and to bridge joints.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Coordination of ABAA Tests and Inspections:
 1. Provide testing and inspection required by ABAA QAP.
 2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
 3. Cooperate with ABAA testing agency.
 4. Allow access to air barrier work areas and staging.

- 5. Do not cover air barrier work until tested, inspected, and accepted.
- C. Do not cover installed weather barriers until required inspections have been completed.
- D. Take digital photographs of each portion of the installation prior to covering up.

3.05 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.
- B. Do not leave paper- or felt-based barriers exposed to weather for longer than one week.

END OF SECTION

**SECTION 07 4113
METAL ROOF PANELS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal roof panel system of preformed steel panels.

1.02 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. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.
- 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 D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017.
- E. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference; 2005 (Reapproved 2017).
- F. ASTM E1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference; 1995 (Reapproved 2018).
- G. ASTM E1680 - Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems; 2016 (Reapproved 2022).
- H. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; Current Edition, Including All Revisions.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Storage and handling requirements and recommendations.
 - 2. Installation methods.
 - 3. Specimen warranty.
- C. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
 - 1. Show work to be field-fabricated or field-assembled.
- D. Selection Samples: For each roofing system specified, submit color chips representing manufacturer's full range of available colors and patterns.
- E. Installer's qualification statement.
- F. Test Reports: Indicate compliance of metal roofing system to specified requirements.
- G. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Provide strippable plastic protection on prefinished roofing panels for removal after installation.

- B. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.

1.06 FIELD CONDITIONS

- A. Do not install metal roof panels, eave protection membrane or underlayment when surface, ambient air, or wind chill temperatures are below 45 degrees F.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Finish Warranty: Provide 20-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with warrantor.
- C. Special Warranty: Provide 5-year warranty for weathertightness of roofing system, including agreement to repair or replace metal roof panels that fail to keep out water commencing on the Date of Substantial Completion. Complete forms in Owner's name and register with warrantor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Architectural Metal Roof Panel Manufacturers:
 - 1. Petersen Aluminum Corporation; Tite-Loc Plus Panel: www.pac-clad.com/#sle.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Metal Roof Panels: Provide complete roofing assemblies, including roof panels, clips, fasteners, connectors, and miscellaneous accessories, tested for compliance with the following minimum standards:
 - 1. Structural Design Criteria: Provide panel assemblies designed to safely support design loads at support spacing indicated, with deflection not to exceed L/180 of span length(L) when tested in accordance with ASTM E1592.
 - a. Dead Loads: Weight of roofing system.
 - b. Live Loads: As required by ASCE 7.
 - 2. Overall: Complete weathertight system tested and approved in accordance with ASTM E1592.
 - 3. Wind Uplift: Class 90 wind uplift resistance of UL 580.
 - 4. Air Infiltration: Maximum 0.06 cfm/sq ft at air pressure differential of 6.24 lbf/sq ft, when tested according to ASTM E1680.
 - 5. Water Penetration: No water penetration when tested in accordance with procedures and recommended test pressures of ASTM E1646; perform test immediately following air infiltration test.
 - 6. Thermal Movement: Design system to accommodate without deformation anticipated thermal movement over ambient temperature range of 100 degrees F.

2.03 METAL ROOF PANELS

- A. Metal Roof Panels: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstanding anticipated movement of substrate and thermally induced movement of roofing system.
- B. Metal Panels: Factory-formed panels with factory-applied finish.
 - 1. Steel Panels:
 - a. Zinc-coated steel complying with ASTM A653/A653M; minimum G60 galvanizing.
 - b. Steel Thickness: Minimum 24 gauge, 0.024 inch.
 - 2. Texture: Smooth, with intermediate ribs for added stiffness.
 - 3. Length: Full length of roof slope, without lapped horizontal joints.

4. Width: Maximum panel coverage of 16 inches.

2.04 ATTACHMENT SYSTEM

- A. Concealed System: Provide manufacturer's standard stainless steel or nylon-coated aluminum concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement.

2.05 FINISHES

- A. Fluoropolymer Coil Coating System: Manufacturer's standard multi-coat metal coil coating system complying with AAMA 2605, including at least 70 percent polyvinylidene fluoride (PVDF) resin, and at least 80 percent of coil coated metal surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch; color and gloss as selected from manufacturer's standards.

2.06 ACCESSORIES

- A. Miscellaneous Sheet Metal Items: Provide flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, and equipment curbs of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.
- B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish or combination steel and closed-cell foam.
- C. Sealants:
 1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.
 2. Concealed Sealant: Non-curing butyl sealant or tape sealant.
- D. Underlayment for Wood Substrate: ASTM D226/D226M roofing felt, perforated type; covered by water-resistant rosin-sized building paper.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation of preformed metal roof panels 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. Broom clean wood sheathing prior to installation of roofing system.
- B. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to ensure that completed roof will be free of leaks.
- C. Remove protective film from surface of roof panels immediately prior to installation; strip film carefully to avoid damage to prefinished surfaces.
- D. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by metal roof panel manufacturer.
- E. Protect surrounding areas and adjacent surfaces from damage during execution of this work.
- F. At locations where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

3.03 INSTALLATION

- A. Overall: Install roofing system in accordance with approved shop drawings and metal roof panel manufacturer's instructions and recommendations, as applicable to specific project

conditions; securely anchor components of roofing system in place allowing for thermal and structural movement.

1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
 2. Minimize field cutting of panels. Where field cutting is required, use methods that will not distort panel profiles. Use of torches for field cutting is prohibited.
- B. Accessories: Install necessary components that are required for complete roofing assembly, including flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.
- C. Install roofing felt and building paper slip sheet on roof sheathing before installing preformed metal roof panels; secure by methods acceptable to roof panel manufacturer, minimizing use of metal fasteners; apply from eaves to ridge in shingle fashion, overlapping horizontal joints at least 2 inches and side and end laps at least 3 inches; offset seams in building paper and seams in roofing felt.
- D. Roof Panels: Install metal roof panels in accordance with manufacturer's installation instructions, minimizing transverse joints except at junction with penetrations.
1. Form weathertight standing seams incorporating concealed clips, using an automatic mechanical seaming device approved by panel manufacturer.
 2. Install sealant or sealant tape at end laps and side joints as recommended by metal roof panel manufacturer.

3.04 CLEANING

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.
- B. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

3.05 PROTECTION

- A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.
- B. Touch-up, repair, or replace damaged roof panels or accessories before Date of Substantial Completion.

END OF SECTION

**SECTION 07 4646
FIBER-CEMENT SIDING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fiber-cement soffit panels, and trim.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

- A. ASTM C1186 - Standard Specification for Flat Fiber Cement Sheets; 2008 (Reapproved 2016).

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
 - 1. Manufacturer's requirements for related materials to be installed by others.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods, including nail patterns.
- C. Installer's Qualification Statement.
- D. Warranty: Submit copy of manufacturer's warranty, made out in Owner's name, showing that it has been registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified in this section with minimum three years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products under waterproof cover and elevated above grade, on a flat surface.

1.07 WARRANTY

- A. See Section 01 7800 - 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 FIBER-CEMENT SIDING

- A. Soffit Panels: Panels made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.
 - 1. Texture: Vented smooth @ eaves; Smooth @ all other locations.
 - 2. Length: 144 inches, nominal.
 - 3. Width: 12 inches.
 - 4. Thickness: 5/16 inch, nominal.
 - 5. Finish: Factory applied primer.
 - 6. Color: White.
 - 7. Manufacturer
 - a. James Hardie Building Products, Inc.; Vented Smooth
 - b. Substitutions: See Section 01 1600 - Product Requirements

2.02 ACCESSORIES

- A. Trim: Fiber cement boards formed under high pressure with integral surface texture.
 - 1. Texture: Smooth.

2. Length: 12' nominal.
 3. Width (height): As indicated on drawings.
 4. Thickness: 1".
 5. Finish: Factory applied primer.
 6. Color: White.
 7. Warranty: 15 year limited; transferable.
 8. Products:
 - a. James Hardie Building Products, Inc.; Hardietrim Boards; 5/4 Smooth; Primed for Paint: www.jameshardie.com.
 - b. Substitutions: See Section 01 1600 - Product Requirements.
- B. Fasteners: Galvanized or corrosion resistant; length as required to penetrate, 1-1/4 inch, minimum.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrate, clean and repair as required to eliminate conditions that would be detrimental to proper installation.
- B. Verify that weather barrier has been installed over substrate completely and correctly.
- C. Do not begin until unacceptable conditions have been corrected.
- D. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions and recommendations.
 1. Read warranty and comply with terms necessary to maintain warranty coverage.
 2. Touch up field cut edges before installing.
 3. Pre-drill nail holes if necessary to prevent breakage.
- B. Over Wood and Wood-Composite Sheathing: Fasten siding through sheathing into studs.
- C. Do not install siding less than 6 inches from surface of ground nor closer than 1 inch to roofs, patios, porches, and other surfaces where water may collect.
- D. After installation, seal joints except lap joints of lap siding; seal around penetrations, and paint exposed cut edges.

3.03 PROTECTION

- A. Protect installed products until Date of Substantial Completion.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

**SECTION 07 5400
THERMOPLASTIC MEMBRANE ROOFING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Adhered system with thermoplastic roofing membrane.
- B. Insulation, flat and tapered.
- C. Flashings.

1.02 REFERENCE STANDARDS

- A. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.
- B. ASTM D6878/D6878M - Standard Specification for Thermoplastic Polyolefin-Based Sheet Roofing; 2021.
- C. NRCA (RM) - The NRCA Roofing Manual; 2025.
- D. NRCA (WM) - The NRCA Waterproofing Manual; 2021.

1.03 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.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, surfacing, and fasteners.
- C. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.
- D. Installer's qualification statement.
- E. Specimen Warranty: For approval.
- F. 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.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of this section with at least three years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact, unless otherwise indicated.
- B. Store materials in weather protected environment, clear of ground and moisture.
- C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.

1.07 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 90 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.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. 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.
 - 2. For repair and replacement include costs of both material and labor in warranty.
 - 3. Exceptions are not Permitted:
 - a. Damage due to roof traffic.
 - b. Damage due to wind speed greater than 56 miles per hour but less than 90 miles per hour.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Thermoplastic Polyolefin (TPO) Membrane Roofing Materials:
 - 1. GAF; EverGuard Extreme TPO 60 mil: www.gaf.com/#sle.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation:
 - 1. GAF; EnergyGuard Polyiso: www.gaf.com/#sle.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ROOFING - UNBALLASTED APPLICATIONS

- A. Thermoplastic Membrane Roofing: One ply membrane, fully adhered, over insulation.
- B. Acceptable Insulation Types - Constant Thickness Application: Any type that meets requirements and is approved by membrane manufacturer for application.
 - 1. Single layer of polyisocyanurate board.
- C. Acceptable Insulation Types - Tapered Application: Any type that meets requirements and is approved by membrane manufacturer for application.
 - 1. Tapered polyisocyanurate board.

2.03 MEMBRANE ROOFING AND ASSOCIATED MATERIALS

- A. Membrane Roofing Materials:
 - 1. TPO: Thermoplastic polyolefin (TPO) complying with ASTM D6878/D6878M, sheet contains reinforcing fabrics or scrims.
 - a. Thickness: 60 mil, 0.060 inch, minimum.
 - 2. Sheet Width:
 - a. Adhered Application: Limit width to 120 inches, maximum, when ambient temperatures are less than 40 degrees F for extended period of time during installation.
 - 3. Color: As selected by Architect from manufacturer's full color range.
- B. Seaming Materials: As recommended by membrane manufacturer.

- C. Membrane Fasteners: As recommended and approved by membrane manufacturer.
- D. Flexible Flashing Material: Same material as membrane.
- E. Through-Wall Flashing with Termination Bar: At least 40 mil, 0.040 inch thick poly-reinforced membrane with extruded termination bar and drip-edge.
 - 1. Width: 18 inches, minimum.

2.04 INSULATION

- A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
 - 1. Classifications:
 - a. Type II: Faced with either cellulosic facers or glass fiber mat facers on both major surfaces of the core foam.
 - 1) Class 1 - Faced with glass fiber reinforced cellulosic facers on both major surfaces of the core foam.
 - 2) Compressive Strength: Classes 1-2-3, Grade 3, 25 psi (172 kPa), minimum.
 - 3) Thermal Resistance, R-value: At 1-1/2 inches thick; Class 1, Grades 1-2-3, 8.4 (1.48), minimum, at 75 degrees F.
 - 2. Board Size: 48 by 96 inches.
 - 3. Board Thickness: 2.0 inches.
 - 4. Tapered Board: Slope as indicated; fabricate of fewest layers possible.
 - 5. Board Edges: Square.

2.05 ACCESSORIES

- A. Membrane Adhesive: As recommended by membrane manufacturer.
- B. Thinners and Cleaners: As recommended by adhesive manufacturer, compatible with membrane.
- C. Insulation Adhesive: As recommended by insulation manufacturer.
- D. Sealants: As recommended by membrane manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.02 PREPARATION - WOOD DECK

- A. Verify flatness and tightness of joints in wood decking; fill knot holes with latex filler.
- B. Confirm dry deck by moisture meter with 12 percent moisture maximum.

3.03 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.

3.04 INSTALLATION - MEMBRANE

- A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- B. Shingle joints on sloped substrate in direction of drainage.
- C. Fully Adhered Application: Apply adhesive to substrate at the rate recommended by the manufacturer.. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.
- D. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.
- E. Mechanical Attachment: Install membrane and mechanical attachment devices in accordance with manufacturer's instructions.
- F. At intersections with vertical surfaces:
 - 1. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.
 - 2. Fully adhere flexible flashing over membrane and up to nailing strips.
- G. Around roof penetrations, seal flanges and flashings with flexible flashing.
- H. Coordinate installation of roof drains and related flashings.

3.05 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Provide daily on-site attendance of roofing and insulation manufacturer's representative during installation of this work.

3.06 CLEANING

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.
- B. Remove bituminous markings from finished surfaces.
- C. 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.
- D. Repair or replace defaced or damaged finishes caused by work of this section.

3.07 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 6200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, counterflashings, and exterior penetrations.
- B. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories: Placement of recessed reglets in formwork.
- B. Section 04 2000 - Unit Masonry: Metal flashings embedded in masonry.
- C. Section 06 1000 - Rough Carpentry: Wood nailers for sheet metal work.
- D. Section 07 9200 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

1.03 REFERENCE STANDARDS

- A. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented 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. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- D. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- F. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).
- G. CDA A4050 - Copper in Architecture - Handbook; Current Edition.
- H. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

1.06 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 MANUFACTURERS

- A. Sheet Metal Flashing and Trim Manufacturers:
 - 1. Petersen Aluminum Corporation: www.pac-clad.com/#sle.

2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 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 Aluminum: ASTM B209 (ASTM B209M); 20 gauge, 0.032 inch thick; plain finish shop pre-coated with modified silicone coating.
 1. Modified Silicone Polyester Coating: Pigmented Organic Coating System, AAMA 2603; baked enamel finish system.
 2. Color: As selected by Architect from manufacturer's full colors.

2.03 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 vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- G. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

2.04 ACCESSORIES

- A. Fasteners: Galvanized steel, with soft neoprene washers.
- B. Primer: Zinc chromate type.
- C. Concealed Sealants: Non-curing butyl sealant.
- D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
- E. Plastic Cement: ASTM D4586/D4586M, Type I.

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. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

- A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for field inspection requirements.
- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION

**SECTION 07 7123
MANUFACTURED GUTTERS AND DOWNSPOUTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pre-finished aluminum gutters and downspouts.
- B. Precast concrete splash pads.

1.02 RELATED REQUIREMENTS

- A. Section 07 4113 - Metal Roof Panels.
- B. Section 07 6200 - Sheet Metal Flashing and Trim.

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. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- D. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Comply with SMACNA (ASMM) for sizing components for rainfall intensity determined by a storm occurrence of 1 in 5 years.
- B. Comply with applicable code for size and method of rain water discharge.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on prefabricated components.
- C. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.
- B. Prevent contact with materials that could cause discoloration, staining, or damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Gutters and Downspouts:
 - 1. ATAS International, Inc; Water Control System: www.atas.com/#sle.
 - 2. Cheney Flashing Company: www.cheneyflashing.com/#sle.
 - 3. OMG Roofing Products: www.omgroofing.com/#sle.
 - 4. SAF Perimeter Systems, a division of Southern Aluminum Finishing Company, Inc: www.saf.com/persys/#sle.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Pre-Finished Aluminum Sheet: ASTM B209 (ASTM B209M); 0.063 inch thick.
 - 1. Finish: Plain, shop pre-coated with modified silicone coating.

2. Color: As selected from manufacturer's standard colors.

2.03 COMPONENTS

- A. Gutters: CDA rectangular style profile.
- B. Downspouts: CDA Rectangular profile.
- C. Anchors and Supports: Profiled to suit gutters and downspouts.
 1. Anchoring Devices: In accordance with CDA requirements.
 2. Gutter Supports: Brackets.
 3. Downspout Supports: Brackets.
- D. Fasteners: Galvanized steel , with soft neoprene washers.

2.04 ACCESSORIES

- A. Splash Pads: Precast concrete type

2.05 FABRICATION

- A. Form gutters and downspouts of profiles and size indicated.
- B. Fabricate with required connection pieces.
- C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- D. Hem exposed edges of metal.
- E. Fabricate gutter and downspout accessories; seal watertight.

2.06 FINISHES

- A. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system; color as selected from manufacturer's standard colors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that surfaces are ready to receive work.

3.02 PREPARATION

- A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

- A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions.
- B. Slope gutters 1/8 inch per foot .
- C. Set splash pads under downspouts.

END OF SECTION

SECTION 07 8400 FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Firestopping systems.
- B. Firestopping of all 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 7000 - Execution and Closeout Requirements: Cutting and patching.

1.03 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2015.
- B. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2013a.
- C. ASTM E1966 - Standard Test Method for Fire Resistive Joint Systems; 2007 (Reapproved 2011).
- D. ITS (DIR) - Directory of Listed Products; current edition.
- E. FM 4991 - Approval Standard for Firestop Contractors; 2013.
- F. FM (AG) - FM Approval Guide; current edition.
- G. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.
- H. UL (DIR) - Online Certifications Directory; Current Edition.
- I. UL (FRD) - Fire Resistance Directory; current edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- C. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- D. Installer Qualification: Submit qualification statements for installing mechanics.

1.05 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
 - 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 will be considered as constituting an acceptable test report.
- B. Installer Qualifications: Company specializing in performing the work of this section and:
 - 1. Trained by manufacturer.
 - 2. With minimum 3 years experience installing work of this type.

1.06 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 MANUFACTURERS

- A. Firestopping Manufacturers:
 - 1. 3M Fire Protection Products: www.3m.com/firestop/#sle.
 - 2. Hilti, Inc: www.us.hilti.com/#sle.
 - 3. Specified Technologies Inc: www.stifirestop.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Firestopping Materials: Any materials meeting requirements.
- B. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.
- C. Fire Ratings: Refer to drawings for required systems and ratings.

2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor 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.
 - 1. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.
- B. 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.
 - 1. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

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 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 authorities having jurisdiction.
- C. Install labeling required by code.

3.04 FIELD QUALITY CONTROL

- A. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.05 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.06 PROTECTION

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 9200 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 07 2500 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders.
- B. Section 08 7100 - Door Hardware: Setting exterior door thresholds in sealant.

1.03 REFERENCE STANDARDS

- A. ASTM C834 - Standard Specification for Latex Sealants; 2014.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.

1.04 SUBMITTALS

- A. See Section 01 3000 - 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. Sample product warranty.
 - 6. Certification by manufacturer indicating that product complies with specification requirements.
- C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

1.06 WARRANTY

- A. See Section 01 7800 - 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 MANUFACTURERS

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
 - 1. Dow Chemical Company: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
 - 2. Hilti, Inc: www.us.hilti.com/#sle.

3. Pecora Corporation: www.pecora.com/#sle.
4. Tremco Global Sealants: www.tremcosealants.com.
5. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
6. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
7. W.R. Meadows, Inc: www.wrmeadows.com/#sle.
8. Substitutions: See Section 01 6000 - Product Requirements.

2.02 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. Joints between door, window, and other frames and adjacent construction.
 - b. Joints between different exposed materials.
 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.
 3. Do not seal the following types of joints.
 - a. 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.

2.03 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. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
 2. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
 3. Color: To be selected by Architect from manufacturer's standard range.
 4. Cure Type: Single-component, neutral moisture curing.
- B. 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, Type OP (opaque).
 2. Color: To be selected by Architect from manufacturer's standard range.
 3. Grade: ASTM C834; Grade - NF.

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. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- D. 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.

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.

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. 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.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. 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.
- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.04 FIELD QUALITY CONTROL

- A. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

END OF SECTION

**SECTION 08 1113
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. Accessories, including glazing, louvers, and matching panels.

1.02 RELATED REQUIREMENTS

- A. Section 08 7100 - Door Hardware.
- B. Section 09 9113 - Exterior Painting: Field painting.
- C. Section 09 9123 - INTERIOR PAINTING: Field painting.

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. SDI: Steel Door Institute.
- G. UL: Underwriters Laboratories.

1.04 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2003 (R2009).
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
- 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, Solution Hardened, and Bake Hardenable; 2015.
- 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; 2014.
- I. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014.
- J. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.

- K. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- L. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- M. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.
- N. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2006.
- O. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- P. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.

1.05 SUBMITTALS

- A. See Section 01 3000 - 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.
- 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 inch by 2 inch in size showing factory finishes, colors, and surface texture.
- E. Installer's Qualification Statement.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of experience.
- B. 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.
 - 2. Curries, an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 3. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.
 - 4. Steelcraft, an Allegion brand: www.allegion.com/#sle.
 - 5. Substitutions: See Section 01 6000 - 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. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
 - 4. Door Edge Profile: Manufacturers standard for application indicated.

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.
 8. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
- 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 primed and field finished.
- B. Exterior Doors: Thermally insulated.
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: 16 gage, 0.053 inch, minimum.
 - e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
 2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
 - 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 Thickness: 1-3/4 inch, nominal.
 4. Door Face Sheets: Flush.
- C. Interior Doors, Non-Fire-Rated:
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 1 - Full Flush.
 - d. Door Face Metal Thickness: 16 gage, 0.053 inch, minimum.
 - e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
 2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
 3. Door Thickness: 1-3/4 inch, nominal.
 4. Door Face Sheets: Flush.
 5. Door Finish: Factory primed and field finished.

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: Factory primed and field finished.

- C. Exterior Door Frames: Full profile/continuously welded type.
 - 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
 - 2. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
 - 3. Frame Finish: Factory primed and field finished.
 - 4. Weatherstripping: Separate, see Section 08 7100.
- D. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
 - 1. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
 - 2. Frame Finish: Factory primed and field finished.
- E. Door Frames, Fire-Rated: Full profile/continuously welded type.
 - 1. Fire Rating: Same as door, labeled.
 - 2. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
 - 3. Frame Finish: Factory primed and field finished.
- F. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inch high to fill opening without cutting masonry units.

2.05 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.06 ACCESSORIES

- A. Glazing: 1/4" tempered glass at all interior doors.
- B. Grout for Frames: Portland cement grout with maximum 4 inch slump for hand troweling; thinner pumpable grout is prohibited.
- C. 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.
- D. 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 fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Install door hardware as specified in Section 08 7100.
 - 1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.
- F. 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 1416
FLUSH WOOD DOORS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Flush wood doors; flush configuration; non-rated.

1.02 RELATED REQUIREMENTS

- A. Section 08 1113 - Hollow Metal Doors and Frames.
- B. Section 08 7100 - Door Hardware.
- C. Section 08 8000 - Glazing.

1.03 REFERENCE STANDARDS

- A. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- B. AWI (QCP) - Quality Certification Program; current edition at www.awiqcp.org.
- C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- D. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; 2016.
- E. ICC (IBC) - International Building Code; 2015.
- F. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2013.

1.04 SUBMITTALS

- A. See Section 01 3000 - 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/WI (AWS) or AWMAC/WI (NAAWS).
- D. Samples: Submit two samples of door veneer, 6 by 6 inch in size illustrating wood grain, stain color, and sheen.
- E. Specimen warranty.
- F. Manufacturer's Installation Instructions: Indicate special installation instructions.
- G. 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.
- C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of experience.

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. Inspect for damage.

- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.07 WARRANTY

- A. See Section 01 7800 - 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. Eggers Industries: www.eggersindustries.com/#sle.
 - 2. Graham Wood Doors: www.grahamdoors.com/#sle.
 - 3. Marshfield DoorSystems, Inc: www.marshfelddoors.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS

- A. Doors: Refer to drawings for locations and additional requirements.
 - 1. Quality Level: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS).
 - 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. 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 structural composite lumber core (SCLC), plies and faces as indicated.

2.04 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: Red oak, veneer grade in accordance with quality standard indicated, quarter cut, with book match between leaves of veneer, balance match of spliced veneer leaves assembled on door or panel face.
 - 1. Vertical Edges: Any option allowed by quality standard for grade.

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. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- F. Provide edge clearances in accordance with the quality standard specified.

2.06 FACTORY FINISHING - WOOD VENEER DOORS

FLUSH WOOD DOORS

HC Goretown Fire Station Additions & Renovations
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- A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
 - 1. Transparent:
 - a. System - 1, Lacquer, Nitrocellulose.
 - b. Sheen: Flat.
- B. Factory finish doors in accordance with approved sample.

2.07 ACCESSORIES

- A. Glazed Openings:
 - 1. Heat-Strengthened and Fully Tempered Glass: ASTM C1048.
- B. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.
- C. Door Hardware: As specified in Section 08 7100.

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.
- 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 3100
ACCESS DOORS AND PANELS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Ceiling-mounted access units.

1.02 SUBMITTALS

- A. See Section 01 3000 - 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.

1.03 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.01 ACCESS DOORS AND PANELS ASSEMBLIES

- A. Ceiling-Mounted Units with Return Air Grille:
 - 1. Location: As indicated on drawings.
 - 2. Panel Material: Aluminum extrusion with gypsum board inlay.
 - 3. Size - As indicated on drawings.
 - 4. 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. BAUCO Access Panel Solutions Inc: www.accesspanelsolutions.com/#sle.
 - a. Concealed Hardware and Gypsum Board Inlay - Regular Size: BAUCO Plus II - Access Panels.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

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

**SECTION 08 3613
SECTIONAL DOORS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Overhead sectional doors, electrically operated.
- B. Operating hardware and supports.
- C. Electrical controls.

1.02 REFERENCE STANDARDS

- A. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- B. DASMA 102 - American National Standard Specifications for Sectional Doors; 2018.
- C. ITS (DIR) - Directory of Listed Products; current edition.
- D. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2008 (Reaffirmed 2020).
- E. NEMA MG 00001 - Motors and Generators; 2024.
- F. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL (DIR) - Online Certifications Directory; Current Edition.
- I. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- C. Product Data: Show component construction, anchorage method, and hardware.
- D. Manufacturer's Installation Instructions: Include any special procedures required by project conditions.
- E. Installer's Qualification Statement.
- F. Operation Data: Include normal operation, troubleshooting, and adjusting.
- G. Maintenance Data: Include data for motor and transmission, shaft and gearing, lubrication frequency, spare part sources.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of type specified and with at least three years documented experience.
- B. Comply with applicable code for motor and motor control requirements.
- C. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction, as suitable for purpose specified.

1.05 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for warranty requirements.

- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for electric motor and transmission.
- D. Provide five year manufacturer warranty for electric operating equipment.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Sectional Doors:
 - 1. Clopay Building Products; Model 3200: www.clopaydoor.com/#sle.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 STEEL DOORS

- A. Steel Doors: Flush steel, insulated; standard lift operating style with track and hardware; complying with DASMA 102, Commercial application.
 - 1. Performance: Withstand positive and negative wind loads equal to 1.5 times design wind loads specified by local code without damage or permanent set, when tested in accordance with ASTM E330/E330M, using 10 second duration of maximum load.
 - 2. Door Nominal Thickness: 2 inches thick.
 - 3. Thermal Transmittance: U-factor of 0.31 Btu/hr sq ft degrees F, maximum, in accordance with DASMA 102.
 - 4. Exterior Finish: Factory finished with standard factory finish; color as selected by Architect.
 - 5. Glazed Lights: four glazed lights per panel, two rows; set in place with resilient glazing channel.
 - a. 1" insulated tempered extruded polypropylene glazing.
 - b. Window Size: 8" x 24".
 - 6. Electric Operation: Electric control station.
- B. Door Panels: Steel construction; outer steel sheet of 24 gauge, 0.0239 inch minimum thickness, light-ribbed profile; inner steel sheet of 28 gauge, 0.015 inch minimum thickness, flat profile; core reinforcement sheet steel roll formed to channel shape, rabbeted weather joints at meeting rails; polyurethane insulation.
- C. Window Frame: Manufacturers standard, finish to match.

2.03 COMPONENTS

- A. Track: Rolled galvanized steel, 0.061 inch minimum thickness; 2 inch wide, continuous one piece per side; galvanized steel mounting brackets 1/4 inch thick.
- B. Sill Weatherstripping: Resilient hollow rubber strip, one piece; fitted to bottom of door panel, full length contact.
- C. Jamb Weatherstripping: Roll formed steel section full height of jamb, fitted with resilient weatherstripping, placed in moderate contact with door panels.
- D. Head Weatherstripping: EPDM rubber seal, one piece full length.
- E. Panel Joint Weatherstripping: Neoprene foam seal, one piece full length.
- F. Lock: Inside center mounted, adjustable keeper, spring activated latch bar with feature to retain in locked or retracted position; interior and exterior handle.

2.04 ELECTRIC OPERATION

- A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
 - 1. Provide interlock switches on motor operated units.
 - 2. Provide tamperproof operation cycle counter.

- B. Electric Operators:
 - 1. Mounting: Side mounted on cross head shaft.
 - 2. Motor: Provide high-starting torque, reversible, continuous-duty, Class A insulated electric motor complying with NEMA MG-1, with overload protection; size to start, accelerate, and operate door in either direction, from any position, at not less than 2/3 fps and not more than 1 fps without exceeding nameplate ratings or considering service factor.
 - 3. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
 - 4. Controller Enclosure: NEMA EN 10250, Type 1.
 - 5. Opening Speed: 12 inches per second.
 - 6. Brake: Solenoid operated.
 - 7. Manual override in case of power failure.
- C. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated; enclose terminal lugs in terminal box sized to comply with NFPA 70.
- D. Control Station: Provide standard three button (Open-Close-Stop) momentary-contact control device for each operator complying with UL 325.
 - 1. Surface mounted, at interior door jamb.
 - 2. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
 - a. Primary Device: Provide electric sensing edge, wireless sensing, NEMA 1 photo eye sensors, or NEMA 4X photo eye sensors as required with momentary-contact control device.
 - b. Secondary Device: Provide electric sensing edge with wireless edge kit or non-monitored safety edge as an option along with continuous-constant control device.
- E. Safety Edge: Located at bottom of sectional door panel, full width; electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object; hollow neoprene covered to provide weatherstrip seal.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- B. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

- A. Install door unit assembly in accordance with manufacturer's instructions.
- B. Anchor assembly to wall construction and building framing without distortion or stress.
- C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- D. Fit and align door assembly including hardware.
- E. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: 1/16 inch.
- B. Maximum Variation from Level: 1/16 inch.
- C. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 ft straight edge.
- D. Maintain dimensional tolerances and alignment with adjacent work.

3.04 ADJUSTING

- A. Adjust door assembly for smooth operation and full contact with weatherstripping.
- B. Have manufacturer's field representative present to confirm proper operation and identify adjustments to door assembly for specified operation.

3.05 CLEANING

- A. Clean doors and frames and glazing.
- B. Remove temporary labels and visible markings.

3.06 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.
- B. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

END OF SECTION

SECTION 08 4413
GLAZED ALUMINUM CURTAIN WALLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum-framed curtain wall, with vision glazing.

1.02 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- B. Section 08 8000 - Glazing.

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 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- D. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- E. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- H. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2015.
- I. 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.
- J. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- K. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).
- L. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2017.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, internal drainage details, glazing, and infill.
- 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.
 - 1. Shop Drawings must be reviewed and approved by the MANUFACTURER prior to submitting to the Architect for review.
- D. Samples: Submit two samples 2 by 6 inches in size illustrating finished aluminum surface, glazing, and glazing materials.

- E. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations; include load calculations at points of attachment to building structure.
- F. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- G. Installer's Qualification Statement.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Designer Qualifications: Design curtain wall and its structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the State in which the Project is located.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of experience.

1.06 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.

1.07 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.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 5-year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units. Complete forms in Owner's name and register with installer.
- C. Finish Warranty: Provide 5-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with warrantor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Glazed Aluminum Curtain Walls Manufacturers:
 - 1. Kawneer North America; 1600 Wall System 1: www.kawneer.com/#sle.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 CURTAIN WALL

- A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Outside glazed, with pressure plate and mullion cover.
 - 2. Fabrication Method: Field fabricated stick system.
 - 3. Glazing Method: Field glazed system.
 - 4. Finish: High performance organic coatings.
 - a. Factory finish 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.
 - c. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.

5. Provide flush joints and corners, weathersealed, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 6. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 7. 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.
 8. Maintain continuous air barrier and/or vapor retarder seal throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel and heel bead of glazing compound.
 9. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- B. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
1. Design Wind Loads: Comply with the following:
 - a. Positive Design Wind Load: 55 lbf/sq ft.
 - b. Measure performance by testing in accordance with ASTM E330/E330M, using test loads equal to 1.5 times the design wind loads and 10 second duration of maximum pressure.
 2. Seismic Loads: Design and size components to withstand seismic loads and sway displacement in accordance with requirements of ASCE 7.
 3. Wind-Borne-Debris Resistance: Identical full-size glazed assembly without auxiliary protection tested by independent agency in accordance with ASTM E1996 for Wind Zone 2 - Enhanced Protection for Large and Small Missile impact and pressure cycling at design wind pressure.
 4. Movement: Accommodate the following movement without damage to components or deterioration of seals:
 - a. Expansion and contraction caused by 180 degrees F surface temperature.
 - b. Expansion and contraction caused by cycling temperature range of 170 degrees F over a 12 hour period.
 - c. Movement of curtain wall relative to perimeter framing.
 - d. Deflection of structural support framing, under permanent and dynamic loads.
- C. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on indoor face when tested as follows:
1. Test Pressure Differential: 12 psf.
 2. Test Method: ASTM E331.
- D. Air Leakage: 0.06 cfm/sq ft maximum leakage of wall area when tested in accordance with ASTM E283/E283M at 6.24 psf pressure difference across assembly.

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.
- B. Glazing: See Section 08 8000.

2.04 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Exposed Flashings: Aluminum sheet, 20-gauge, 0.032-inch minimum thickness; finish to match framing members.

- C. Weatherseal Sealant: Silicone, with adhesion in compliance with ASTM C794; compatible with glazing accessories.
- D. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, and compatible with flashing material.
- E. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- F. Glazing Accessories: See Section 08 8000.

2.05 FINISHES

- A. High Performance Organic Coatings: AAMA 2604; multiple coats, thermally cured fluoropolymer system.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other related work.
- B. Verify that curtain wall openings and adjoining water-resistive and air barrier seal materials are ready to receive work of this section.
- C. Verify that anchorage devices have been properly installed and located.

3.02 INSTALLATION

- A. Install curtain 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. 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 noncumulative or 0.5 inches per 100 feet, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.
- C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch and minimum of 1/4 inch.

3.04 FIELD QUALITY CONTROL

- A. Provide services of curtain wall manufacturer's field representative to observe for proper installation of system and submit report.
- B. Water-Spray Test: Provide water spray quality test of installed curtain wall components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
- C. Repair or replace curtain wall components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.05 CLEANING

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.

- B. Remove protective material from pre-finished aluminum surfaces.
- C. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, take care to remove dirt from corners, and wipe surfaces clean.
- D. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

END OF SECTION

**SECTION 08 5113
ALUMINUM WINDOWS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Extruded aluminum windows with fixed sash and operating sash.
- B. Factory glazing.
- C. Operating hardware.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Wood perimeter shims.
- B. Section 07 2500 - Weather Barriers: Sealing frame to water-resistive barrier installed on adjacent construction.
- C. Section 07 9200 - Joint Sealants: Sealing joints between window frames and adjacent construction.
- D. Section 08 8000 - Glazing.

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; 2012.
- D. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- G. 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.
- H. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).
- I. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors; 2002 (Reapproved 2018).
- J. 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.
- K. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2017.
- L. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights; 2007.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.

- B. Product Data: Include component dimensions, information on glass and glazing, internal drainage details, and descriptions of hardware and accessories.
- C. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, anchorage locations, and installation requirements.
- D. 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.
- E. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) by independent testing agency showing compliance with performance requirements in excess of those prescribed by specified grade.
- F. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- G. Installer's qualification statement.
- H. Specimen warranty.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of 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 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F.
- B. Maintain this minimum temperature during and 24 hours after installation of sealants.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Manufacturer Warranty: Provide 5-year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units. Complete forms in Owner's name and register with manufacturer.
- D. Manufacturer Warranty: Provide 20-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Aluminum Windows Manufacturers:
 - 1. Kawneer; 8400TL Thermal Fixed Window.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

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. Frame Depth: 4 inch.
 - 2. Operable Units: Double weatherstripped.
 - 3. Provide factory-glazed units.
 - 4. 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.
 - 5. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
 - 6. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
 - 7. 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.
 - 8. Thermal Movement: Design to accommodate thermal movement caused by 180 degrees F surface temperature without buckling stress on glass, joint seal failure, damaging loads on structural elements, damaging loads on fasteners, reduction in performance or other detrimental effects.
- B. Fixed, Non-Operable Type:
 - 1. Construction: Thermally broken.
 - 2. Glazing: Double; clear; low-e.
 - 3. Exterior Finish: High performance organic coatings.
 - 4. Interior Finish: High performance organic coatings.
- C. Outswinging Casement Type:
 - 1. Construction: Thermally broken.
 - 2. Glazing: Double; clear; low-e.
 - 3. Exterior Finish: High performance organic coatings.
 - 4. Interior Finish: High performance organic coatings.

2.03 PERFORMANCE REQUIREMENTS

- A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
 - 1. Performance Class (PC): AW.
- B. Design Pressure (DP): In accordance with applicable codes.
- C. Wind-Borne-Debris Resistance: Identical full-size glazed assembly without auxiliary protection, tested by independent agency in accordance with ASTM E1996 for Wind Zone 4 - Additional Protection for Large and Small Missile impact and pressure cycling at design wind pressure.
- D. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 12.11 psf.
- E. Air Leakage: 0.10 cfm/sq ft maximum leakage per unit area of outside window frame dimension when tested at 6.2 psf pressure difference in accordance with ASTM E283/E283M.
- F. Overall Thermal Transmittance (U-value): 0.48, maximum, including glazing, measured on window sizes required for this project.

2.04 COMPONENTS

- A. Frames: Sizes as indicated on drawings, of 4" thick section, thermally broken with interior portion of frame insulated from exterior portion.
- B. Glazing: See Section 08 8000.

- C. Sills: 0.062 inch thick, extruded aluminum; sloped for positive wash; fit under sash leg to 1/2 inch beyond wall face; one piece full width of opening; jamb angles to terminate sill end.
- D. Sills: Extruded
- E. Operable Sash Weatherstripping: Wool pile; permanently resilient, profiled to achieve effective weather seal.
- F. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

2.05 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

2.06 HARDWARE

- A. Operator: Lever action handle fitted to projecting sash arms with limit stops.

2.07 FINISHES

- A. High Performance Organic Coatings: AAMA 2604; multiple-coat, thermally-cured fluoropolymer system.
- B. Finish Color: As indicated on drawings.
- C. Apply one coat of bituminous coating to concealed aluminum and steel surfaces in contact with dissimilar materials.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that wall openings and adjoining water-resistive barrier materials are ready to receive aluminum windows; see Section 07 2500.

3.02 PRIME WINDOW INSTALLATION

- A. Install windows in accordance with manufacturer's instructions.
- B. Install window assembly in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.
- C. Install windows in accordance with ASTM E2112.
- D. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- E. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- F. Install sill and sill end angles.
- G. Set sill members and sill flashing in continuous bead of sealant.
- H. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Install operating hardware not pre-installed by manufacturer.
- J. Install glass in accordance with requirements; see Section 08 8000.

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 services of aluminum window manufacturer's field representative to observe for proper installation of system and submit report.

- B. See Section 01 4000 - Quality Requirements for independent field testing and inspection requirements, and requirements for monitoring quality of specified product installations.
- C. 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.
- D. Repair or replace fenestration components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.05 ADJUSTING

- A. Adjust hardware for smooth operation and secure weathertight closure.

3.06 CLEANING

- A. Remove protective material from factory finished aluminum surfaces.
- B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.
- C. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION

**SECTION 087100
DOOR HARDWARE**

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 Section "Alternates" for alternates affecting this section.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:
 - a. "Metal Doors and Frames"
 - b. "Flush Wood Doors"
 - c. "Stile and Rail Wood Doors"
 - d. "Interior Aluminum Doors and Frames"
 - e. "Aluminum-Framed Entrances and Storefronts"
 - f. "Stainless Steel Doors and Frames"
 - g. "Special Function Doors"
 - h. "Entrances"

1.02 REFERENCES

A. UL LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
2. NFPA 101 – Life Safety Code
3. NFPA 105 – Smoke and Draft Control Door Assemblies
4. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:
 - a. Review drawings and Sections from related trades to verify compatibility with specified hardware.
 - b. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
 - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
3. Door Hardware Schedule:
 - a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
 - b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
 - c. Indicate complete designations of each item required for each opening, include:
 - 1) Door Index: door number, heading number, and Architect's hardware set number.
 - 2) Quantity, type, style, function, size, and finish of each hardware item.
 - 3) Name and manufacturer of each item.
 - 4) Fastenings and other pertinent information.
 - 5) Location of each hardware set cross-referenced to indications on Drawings.

- 6) Explanation of all abbreviations, symbols, and codes contained in schedule.
- 7) Mounting locations for hardware.
- 8) Door and frame sizes and materials.
- 9) Degree of door swing and handing.

4. Key Schedule:

- a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
- b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
- c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
- d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
- e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
- f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

C. Informational Submittals:

1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
2. Provide Product Data:
 - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
 - b. Include warranties for specified door hardware.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
 - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Final approved hardware schedule edited to reflect conditions as installed.
 - d. Final keying schedule
 - e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

E. Inspection and Testing:

1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:
 - a. Fire door assemblies, in compliance with NFPA 80.
 - b. Required egress door assemblies, in compliance with NFPA 101.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
 - a. For door hardware: DHI certified AHC or DHC.
 - b. Can provide installation and technical data to Architect and other related subcontractors.
 - c. Can inspect and verify components are in working order upon completion of installation.
4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:
 - a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
 - b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
2. Smoke and Draft Control Door Assemblies:
 - a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
 - b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.
3. Accessibility Requirements:
 - a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C. Pre-Installation Meetings

1. Keying Conference
 - a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - 1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2) Preliminary key system schematic diagram.
 - 3) Address for delivery of keys.

2. Pre-installation Conference
 - a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Inspect and discuss preparatory work performed by other trades.
 - c. Review required testing, inspecting, and certifying procedures.
 - d. Review questions or concerns related to proper installation and adjustment of door hardware.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
- C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
- D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1.07 WARRANTY

- A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.
 1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
 2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
 - a. Mechanical Warranty
 - 1) Locks
 - a) Best Cylindrical: 3 Year

- 2) Exit Devices
 - a) Von Duprin: 3 years
- 3) Closers
 - a) LCN 4050 Series: 25 years
 - b) LCN 1450 Series: 25 years
- 4) Automatic Operators
 - a) LCN: 2 years

1.08 MAINTENANCE

- A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
- B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Approval of alternate manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category are only to be considered by official substitution request in accordance with section 01 25 00.
- B. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

- A. Fabrication
 - 1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer's recognized installation standards for application intended.
 - 2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
 - 3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with "Metal Doors and Frames", "Flush Wood Doors", "Stile and Rail Wood Doors" to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.
- B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.
 - 1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Ives 5BB series
2. Acceptable Manufacturers and Products:
 - a. Hager BB1191/1279 series
 - b. McKinney TB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins
 - b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins

2.04 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Best 45H series
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.
2. Indicators: Where specified, provide indicator window measuring a minimum 2-inch x 1/2 inch with 180-degree visibility. Provide messages color-coded with full text and/or symbols, as scheduled, for easy visibility.
3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.

4. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.
5. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches.
7. Provide motor based electrified locksets that comply with the following requirements:
 - a. Universal input voltage – single chassis accepts 12 or 24VDC to allow for changes in the field without changing lock chassis.
 - b. Fail Safe/Fail Secure – changing mode between electrically locked (fail safe) and electrically unlocked (fail secure) is field selectable without opening the lock case.
 - c. Low maximum current draw – maximum 0.4 amps to allow for multiple locks on a single power supply.
 - d. Low holding current – maximum 0.01 amps to produce minimal heat, eliminate “hot levers” in electrically locked applications, and to provide reliable operation in wood doors that provide minimal ventilation and air flow.
 - e. Connections – provide quick-connect Molex system standard.
8. (KEY OVERRIDE OPTION WHEN XL13-439 IS SPECIFIED IN HARDWARE SETS)
Provide locks with a key override feature built into the chassis that allows the outside key to retract the deadbolt and/or latchbolt, overriding the inside thumbturn when it is being held in the locked position.
9. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
 - a. Provide levers that return to within 1/2 inch (13 mm) of door face.
 - b. Vandlgard: Provide levers with vandal resistant technology for use at heavy traffic or abusive applications.

2.05 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Best 9k Series
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
 - a. Provide levers that return to within 1/2 inch (13 mm) of door face.

- b. Vandlgard: Provide levers with vandal resistant technology for use at heavy traffic or abusive applications.

2.06 CYLINDERS

A. Manufacturers:

- 1. Scheduled Manufacturer and Product:
 - a. AS REQUIRED TO MATCH EXISTING
- 2. Acceptable Manufacturers and Products:

B. Requirements:

- 1. Provide cylinders/cores to match Owner's existing key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.

2.07 KEYING

A. Scheduled System:

- 1. Existing factory registered system:
 - a. Provide cylinders/cores keyed into Owner's existing factory registered keying system. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:

- 1. Construction Keying:
 - a. Replaceable Construction Cores.
 - 1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
 - a) 3 construction control keys
 - b) 12 construction change (day) keys.
 - 2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.
- 2. Permanent Keying:
 - a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - 1) Master Keying system as directed by the Owner.
 - b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
 - c. Provide keys with the following features:
 - 1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
 - 2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
 - d. Identification:
 - 1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
 - 2) Identification stamping provisions must be approved by the Architect and Owner.

- 3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
- 4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
- 5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
- e. Quantity: Furnish in the following quantities.
 - 1) Change (Day) Keys: 3 per cylinder/core.
 - 2) Permanent Control Keys: 3.
 - 3) Master Keys: 6.

2.08 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. LCN 4050A series
2. Acceptable Manufacturers and Products:
 - a. Falcon SC70A series
 - b. Sargent 351 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with cast aluminum cylinder.
3. Closer Body: 1-1/2-inch (38 mm) diameter with 11/16-inch (17 mm) diameter heat-treated pinion journal and full complement bearings.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and all weather requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and back check.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide stick on templates, special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.09 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. LCN 1450 series
2. Acceptable Manufacturers and Products:
 - a. Falcon SC80A series

- b. Sargent 1331 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory.
2. Provide door closers with fully hydraulic, full rack and pinion action with cast aluminum cylinder.
3. Closer Body: 1-3/8-inch (35 mm) diameter with 5/8-inch (16 mm) diameter pinion journal diameter heat-treated pinion journal and full complement bearings.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Pressure Relief Valve (PRV) Technology: Not permitted.
7. Provide stick on and special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.10 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.11 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:
 - a. Glynn-Johnson
2. Acceptable Manufacturers:
 - a. Rixson
 - b. Sargent
 - c. ABH

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.
2. Provide friction type at doors without closer and positive type at doors with closer.

2.12 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco
 - c. Rockwood

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button or thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.13 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Zero International
2. Acceptable Manufacturers:
 - a. National Guard
 - b. Reese
 - c. DHSI
 - d. Legacy
 - e. Pemko

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.14 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Rockwood
 - c. Trimco

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.15 ROLLER LATCHES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco
 - c. Rockwood

B. Requirements:

1. Provide roller latches with 4-7/8 inches (124 mm) strike at single doors to fit ANSI frame prep. If dummy levers are used in conjunction with roller latch mount roller latch at a height as to not interfere with proper mounting and height of dummy lever.
2. Provide roller latches with 2-1/4 inches (57 mm) full lip strike at pair doors. Mount roller in top rail of each leaf per manufacturer's template.

2.16 FINISHES

A. FINISH: BHMA 626/652 (US26D); EXCEPT:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
4. Protection Plates: BHMA 630 (US32D)
5. Overhead Stops and Holders: BHMA 630 (US32D)
6. Door Closers: Powder Coat to Match
7. Wall Stops: BHMA 630 (US32D)
8. Latch Protectors: BHMA 630 (US32D)
9. Weatherstripping: Clear Anodized Aluminum
10. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
 - 4. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.
- C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
- I. Lock Cylinders:
 - 1. Install construction cores to secure building and areas during construction period.
 - 2. Replace construction cores with permanent cores as indicated in keying section.
- J. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.

- K. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- L. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- M. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- N. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- O. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items per manufacturer's instructions to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

- A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
- C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.

D. Hardware Sets:

Hardware Group No. 01

For use on Door #(s):

001

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	ENTRY LOCK	73KC AB 15D		630	BES
1	EA	OH STOP	90S		630	GLY
1	EA	SURFACE CLOSER	4050A EDA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
3	EA	SILENCER	SR64/65 AS REQ		GRY	IVE
			AT NON-RATED			

Hardware Group No. 03

For use on Door #(s):

005

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	KEYPAD LOCK WITH KEY OVERRIDE	45HZ7TV15KG		626	BES
1	EA	SURFACE CLOSER	4050A SCUSH		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	655A-223		A	ZER

Hardware Group No. 04

For use on Door #(s):

006.1

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PASSAGE SET	73KC N 15D		630	BES
1	EA	SURFACE CLOSER	4050A EDA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

Hardware Group No. 05

For use on Door #(s):

006.2

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PASSAGE SET	73KC N 15D		630	BES
1	EA	OH STOP	90S		630	GLY
1	EA	SURFACE CLOSER	4050A EDA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

Hardware Group No. 06

For use on Door #(s):

008

013

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CASED OPENING	NO HARDWARE REQ'D			

Hardware Group No. 07

For use on Door #(s):

009

010

011

012

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		630	IVE
1	EA	PRIVACY LOCK	73KC L 15D		630	BES
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64/65 AS REQ AT NON-RATED		GRY	IVE

Hardware Group No. 08

For use on Door #(s):

014

102

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM LOCK	73KC R 15D		630	BES
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64/65 AS REQ AT NON-RATED		GRY	IVE

Hardware Group No. 09

For use on Door #(s):

015 016

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	ENTRY LOCK	73KC AB 15D		630	BES
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64/65 AS REQ AT NON-RATED		GRY	IVE

Hardware Group No. 10

For use on Door #(s):

100

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	RIM CYLINDER	AS REQ'D TO MATCH EXISTING			
1	EA	SURFACE CLOSER	4050A SCUSH		689	LCN
	EA	BALANCE OF HARDWARE	BY ALUMINUM DOOR SUPPLIER			

1. THE HARDWARE SUPPLIER SHALL COORDINATE CYLINDER REQUIREMENTS WITH THE WIND IMPACT DOOR SUPPLIER'S HARDWARE & FURNISH THE TYPE REQUIRED.
2. THE HARDWARE SUPPLIER SHALL BE RESPONSIBLE TO INCLUDE ANY FASTENERS, BRACKETS, AND HARDWARE ACCESSORIES REQUIRED TO COMPLETE THE INTENDED APPLICATION.
3. THE WIND IMPACT DOOR SUPPLIER SHALL FURNISH THE HANGING HARDWARE, AND THE PANIC EXIT DEVICE HARDWARE, AND THE WEATHERSTRIPPING. SEE DOOR FUNCTION REQ'D.
4. DOOR FUNCTION: DOOR IS NORMALLY CLOSED AND LOCKED. ENTRY BY KEY. DOOR MAY BE DOGGED UNLOCKED DURING BUSINESS HOURS FOR FREE ENTRY. DOOR ALWAYS AVAILABLE FOR FREE EGRESS.

Hardware Group No. 11

For use on Door #(s):

101

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	KEYPAD LOCK WITH KEY OVERRIDE	9KZ3-7DV15KP		626	BES
1	EA	SURFACE CLOSER	4050A EDA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	655A-223		A	ZER

Hardware Group No. 12

For use on Door #(s):

101.3 106 107

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	STOREROOM LOCK	45H-7-D-15H		626	BES
1	EA	SURFACE CLOSER	4050A SCUSH		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	655A-223		A	ZER

Hardware Group No. 13

For use on Door #(s):

103 104

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	73KC D 15D		630	BES
1	EA	SURFACE CLOSER	1450 SCUSH STD		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	655A-223		A	ZER

END OF SECTION

**SECTION 08 8000
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 07 9200 - Joint Sealants: Sealants for other than glazing purposes.
- B. Section 08 1113 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.
- C. Section 08 1416 - FLUSH WOOD DOORS: Glazed lites in doors.
- D. Section 08 4413 - Glazed Aluminum Curtain Walls: Glazing furnished as part of wall assembly.
- E. Section 08 5113 - Aluminum Windows: Glazing furnished by window manufacturer.

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 for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.
- D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2011).
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- F. ASTM C1036 - Standard Specification for Flat Glass; 2011.
- G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- H. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.
- I. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.
- J. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2012a.
- K. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2017.
- L. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- M. GANA (GM) - GANA Glazing Manual; 2008.
- N. GANA (SM) - GANA Sealant Manual; 2008.
- O. GANA (LGRM) - Laminated Glazing Reference Manual; 2009.
- P. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (2004).
- Q. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2017.
- R. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2014, with Errata (2017).

- S. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2017.

1.04 SUBMITTALS

- A. See Section 01 3000 - 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 4 by 4 inch in size of glass units.
- E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods. Maintain one copy on site.

1.06 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.

1.07 WARRANTY

- A. See Section 01 7800 - 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.
- C. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Glass Fabricators:
 - 1. Trulite Glass & Aluminum Solutions, LLC: www.trulite.com/#sle.
 - 2. Viracon, Inc: www.viracon.com/#sle.
 - 3. Substitutions: Refer to Section 01 6000 - Product Requirements.
- B. Float Glass Manufacturers:
 - 1. Cardinal Glass Industries: www.cardinalcorp.com/#sle.
 - 2. Guardian Glass, LLC: www.guardianglass.com/#sle.
 - 3. Pilkington North America Inc: www.pilkington.com/na/#sle.
 - 4. Substitutions: Refer to Section 01 6000 - Product Requirements.
- C. Laminated Glass Manufacturers:
 - 1. Cardinal Glass Industries: www.cardinalcorp.com/#sle.
 - 2. Viracon, Architectural Glass segment of Apogee Enterprises, Inc: www.viracon.com/#sle.
 - 3. Substitutions: Refer to Section 01 6000 - 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. 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 FT - Fully Tempered Type: Complies with ASTM C1048.
 - 3. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
 - 4. Impact Resistant Safety Glass: Complies with ANSI Z97.1 - Class B, or 16 CFR 1201 - Category I criteria.
 - 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 I impact test requirements.
 - 2. Polyvinyl Butyral (PVB) Interlayer: 0.030 inch thick, minimum.

2.04 INSULATING GLASS UNITS

- A. Insulating Glass Units: Types as indicated.
 - 1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 - 2. Spacer Color: Black.
 - 3. 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.
 - 4. Purge interpane space with dry air, hermetically sealed.
- B. Type IG-1 - Insulating Glass Units: Vision glass, double glazed.
 - 1. Applications: Exterior glazing unless otherwise indicated.
 - 2. Space between lites filled with argon.
 - 3. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 - b. Coating: Low-E (passive type), on #2 surface.

4. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
5. Total Thickness: 1 inch.

2.05 GLAZING UNITS

- A. Type G-5 - Monolithic Safety Glazing: Non-fire-rated.
 1. Applications:
 - a. Glazed lites in doors, except fire doors.
 2. Glass Type: Fully tempered safety glass as specified.
 3. Tint: Clear.
 4. Thickness: 1/4 inch, nominal.
- B. Type G-8 - Hurricane Impact Resistance Glazing: Laminated glass.
 1. Applications: All exterior openings with aluminum curtainwall and/or storefront framing.
 2. Tint: Clear.
 3. Thickness: As required to meet performance criteria.
 4. Outside Lite: Annealed glass.
 5. Interlayer, Inboard Side: Polyvinyl butyral (PVB), thickness as required to meet performance criteria.
 6. Inside Lite: Annealed glass.
 7. Performance Criteria:
 - a. Hurricane Impact Resistance: Comply with ASTM E1996 windborne debris requirements for "Enhanced Protection" within Wind Zone 1.
 8. Visible Light Transmittance (VLT): 34 percent, nominal.
 9. Solar Heat Gain Coefficient (SHGC): 24, nominal.
 10. Glazing Method: As required to meet performance criteria.

2.06 GLAZING COMPOUNDS

- A. Type GC-2 - Butyl Sealant: Single component; ASTM C920 Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.
- B. Type GC-5 - 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.

2.07 ACCESSORIES

- A. Setting Blocks: Silicone, 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. Continuous 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.
- D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

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 (TAPE AND GASKET SPLINE GLAZING)

- A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
- B. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- E. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
- F. Carefully trim protruding tape with knife.

3.05 INSTALLATION - WET/DRY GLAZING METHOD (PREFORMED TAPE AND SEALANT)

- A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
- B. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.
- C. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
- D. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

- E. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
- F. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch below sight lines.
 - 1. Place glazing tape on glazing pane of unit with tape flush with sight 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

SECTION 08 9100 LOUVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Louvers, frames, and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 2500 - Weather Barriers: Sealing frames to water-resistive barrier installed on adjacent construction.
- B. Section 07 9200 - Joint Sealants: Sealing joints between frames 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. AMCA 511 - Certified Ratings Program Product Rating Manual for Air Control Devices; 2021, with Editorial Revision (2022).
- 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 B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- F. FEMA P-361 - Safe Rooms for Tornadoes and Hurricanes: Guidance for Community and Residential Safe Rooms; 2015.
- G. ICC 500 - ICC/NSSA Standard for the Design and Construction of Storm Shelters; National Storm Shelter Association; 2014.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.
- C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, and tolerances; head, jamb and sill details; blade configuration, screens, blank-off areas required, and frames.
- D. Samples: Submit two samples 2 by 2 inches in size illustrating finish and color of exterior surfaces.
- E. Test Reports: Independent agency reports showing compliance with specified performance criteria.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of experience.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Provide five year manufacturer's warranty against distortion, metal degradation, and connection failures of louver components.

1. Finish: Include twenty year coverage against degradation of exterior finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Louvers:
 1. Airline Louvers: www.airlinelouvers.com/#sle.
 2. Airolite Company, LLC: www.airolite.com/#sle.
 3. Ruskin Company; Louvers: www.ruskin.com/#sle.
 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 LOUVERS

- A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
 1. High-Velocity Wind Load Resistance: Design to comply with applicable requirements of ICC 500 and FEMA P-361, including resistance to horizontal debris impact.
 2. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
 3. Screens: Provide insect screens at intake louvers and bird screens at exhaust louvers.
- B. Stationary Louvers: Horizontal blade, extruded aluminum construction, with intermediate mullions matching frame.
 1. Free Area: 50 percent, minimum.
 2. Blades: Drainable.
 3. Frame: 6 inches deep, channel profile; corner joints mitered and , with continuous recessed caulking channel each side.
 4. Aluminum Thickness: Frame 12 gauge, 0.0808 inch minimum; blades 12 gauge, 0.0808 inch minimum.
 5. Aluminum Finish: High performance organic coatings; finish welded units after fabrication.

2.03 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).

2.04 FINISHES

- A. High Performance Organic Coatings: AAMA 2604; multiple coats, thermally cured fluoropolymer system.

2.05 ACCESSORIES

- A. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.
- B. Bird Screen: Interwoven wire mesh of steel, 14 gauge, 0.0641 inch diameter wire, 1/2 inch open weave, diagonal design.
- C. Insect Screen: 18 x 16 size aluminum mesh.
- D. Fasteners and Anchors: Galvanized steel.
- E. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.
- F. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.
- B. Verify that field measurements are as indicated.

3.02 INSTALLATION

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Coordinate with installation of flashings by others.
- C. Install louvers level and plumb.
- D. Set sill members and sill flashing in continuous bead of sealant.
- E. Align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- F. Secure louver frames in openings with concealed fasteners.

3.03 CLEANING

- A. Strip protective finish coverings.
- B. Clean surfaces and components.

END OF SECTION

**SECTION 09 2116
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. Acoustic insulation.
- E. Gypsum wallboard.
- F. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping: Top-of-wall assemblies at fire rated walls.
- B. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

1.03 REFERENCE STANDARDS

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2012.
- 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 C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- D. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2014.
- E. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015.
- F. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.
- G. 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; 2015.
- 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; 2014.
- I. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- J. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.
- K. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- L. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- M. GA-216 - Application and Finishing of Gypsum Board; 2013.
- N. ICC (IBC) - International Building Code; 2015.
- O. UL (FRD) - Fire Resistance Directory; current edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

- B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
- C. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum three years of documented experience.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
 - 1. See PART 3 for finishing requirements.
- B. Fire Rated Assemblies: Provide completed assemblies with the following characteristics:
 - 1. Fire Rated Partitions: UL listed assembly No. U419; 1 hour rating.
 - 2. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

2.02 METAL FRAMING MATERIALS

- A. Non-Loadbearing 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/120 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.
- B. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
 - 1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
 - 2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot dipped galvanized coating.
- C. Non-Loadbearing Framing Accessories:
 - 1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.

2.03 BOARD MATERIALS

- A. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut, Type 'X'.
 - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. Mold resistant board is required at all locations.
 - 3. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 - 4. Thickness:
 - a. Vertical Surfaces: 5/8 inch.
 - b. Ceilings: 5/8 inch.

2.04 GYPSUM WALLBOARD ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: 3.5 inch.

- B. Beads, Joint Accessories, and Other Trim: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
 - 1. Rigid Corner Beads: Low profile, for 90 degree outside corners.
- C. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 - 1. Tape: 2 inch wide, coated glass fiber tape for joints and corners.
 - 2. Joint Compound: Drying type, vinyl-based, ready-mixed.
- D. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.
- E. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion resistant.

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 in all locations.
 - 2. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
- D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- E. Blocking: Install mechanically fastened steel sheet blocking for support of:
 - 1. Wall mounted cabinets and countertops.
 - 2. Plumbing fixtures.
 - 3. Toilet accessories.

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.

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 Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- D. Installation on Metal Framing: Use screws for attachment of gypsum board.

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.
- B. Corner Beads: Install at external corners, using longest practical lengths.

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.
- 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 is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.

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

**SECTION 09 5100
ACOUSTICAL CEILINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.
- C. Supplementary acoustical insulation above ceiling.

1.02 RELATED REQUIREMENTS

- A. Section 26 5100 - Interior Lighting: Light fixtures in ceiling system.

1.03 REFERENCE STANDARDS

- A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.
- B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2013.
- C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2014.
- D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.

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 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on suspension system components.
- C. Samples: Submit two samples 4 x 4 inch in size illustrating material and finish of acoustical units.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Acoustical Units: 50 sq ft of each type and size.

1.06 QUALITY ASSURANCE

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.07 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 MANUFACTURERS

- A. Acoustic Tiles/Panels:
 - 1. USG; Astro Clima-Plus #8122: www.usg.com/#sle.

2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Suspension Systems:
 1. USG; DX: www.usg.com/#sle.
 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ACOUSTICAL UNITS

- A. Acoustical Units - General: ASTM E1264, Class A.
- B. Acoustical Panels:
 1. Size: 24 by 24 inches.
 2. Light Reflectance: 86 percent, determined in accordance with ASTM E1264.
 3. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
 4. Panel Edge: Square.
 5. Surface Color: White.
 6. Suspension System: Exposed gridType Heavy Duty.

2.03 SUSPENSION SYSTEM(S)

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
- B. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; heavy-duty.
 1. Profile: Tee; 15/16 inch wide face.
 2. Construction: Double web.
 3. Finish: White painted.
 4. Products:
 - a. USG Corporation; DX - Heavy Duty.

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. Perimeter Moldings: Same material and finish as grid.
 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

PART 3 EXECUTION

3.01 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section as required for Site Class 'D'.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Locate system on room axis according to reflected ceiling plan.
- D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- E. 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.
- F. 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.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

- H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- I. Do not eccentrically load system or induce rotation of runners.
- J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
 - 2. Overlap and rivet corners.

3.02 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 units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
 - 1. Make field cut edges of same profile as factory edges.
- G. Where round obstructions occur, provide preformed closures to match perimeter molding.

3.03 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

**SECTION 09 6500
RESILIENT FLOORING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient base.
- B. Installation accessories.

1.02 REFERENCE STANDARDS

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.
- B. ASTM F1700 - Standard Specification for Solid Vinyl Tile; 2013a.
- C. ASTM F1861 - Standard Specification for Resilient Wall Base; 2008 (Reapproved 2012).
- D. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; Resilient Floor Covering Institute; October 2011.

1.03 SUBMITTALS

- A. See Section 01 3000 - 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. Verification Samples: Submit two samples, four by four inch in size illustrating color and pattern for each resilient flooring product specified.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in installing specified flooring with minimum three years experience.

1.05 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. Protect roll materials from damage by storing on end.
- E. Do not double stack pallets.

1.06 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 RESILIENT BASE

- A. Resilient Base: ASTM F1861, Type TP, rubber, thermoplastic; top set Style B, Cove.
 - 1. Manufacturers:
 - a. Johnsonite, a Tarkett Company; Traditional Wall Base: www.johnsonite.com.
 - 2. Height: As indicated on drawings.
 - 3. Thickness: 0.25 inch thick.
 - 4. Color: As indicated on drawings.

2.02 ACCESSORIES

- A. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
- B. Filler for Coved Base: Plastic.

PART 3 EXECUTION

3.01 EXAMINATION

- A. 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.

3.02 INSTALLATION - GENERAL

- A. Install in accordance with manufacturer's written instructions.
- B. Adhesive-Applied Installation:
 - 1. Spread only enough adhesive to permit installation of materials before initial set.

3.03 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, 'V' cut back of base strip to 2/3 of its thickness and fold. At exposed ends, use premolded units.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

3.04 CLEANING

- A. Remove excess adhesive from base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

END OF SECTION

**SECTION 09 6700
FLUID-APPLIED FLOORING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fluid-applied flooring and base.

1.02 REFERENCE STANDARDS

- A. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.
- C. Samples: Submit two samples, 4 by 4 inch in size illustrating color and pattern for each floor material for each color specified.
- D. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and application rate for each coat.
- F. Applicator's Qualification Statement.
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.

1.04 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the work of this section.
 - 1. Minimum 3 years of experience.
 - 2. Approved by manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store resin materials in a dry, secure area.
- B. Store materials for three days prior to installation in area of installation to achieve temperature stability.

1.06 FIELD CONDITIONS

- A. Maintain minimum temperature in storage area of 55 degrees F.
- B. Store materials in area of installation for minimum period of 24 hours prior to installation.
- C. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fluid-Applied Flooring:
 - 1. Stonhard; www.stonhard.com.

2.02 FLUID-APPLIED FLOORING SYSTEMS

- A. Fluid-Applied Flooring: Epoxy base coat(s), with broadcast aggregate.
 - 1. Aggregate: Quartz granules.
 - 2. System Thickness: 3/16 inch, nominal, dry film thickness (DFT).
 - 3. Texture: Slip resistant.

4. Color: EP-1: Driftwood; EP-2: Espresso.
5. Products:
 - a. Stonhard; Stonshield HRI: www.stonhard.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.03 ACCESSORIES

- A. Subfloor Filler: Type recommended by fluid-applied flooring manufacturer.
- B. Primer: Type recommended by fluid-applied flooring manufacturer.

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 flooring.
- 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 flooring.
- C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for fluid-applied flooring installation by testing for moisture and alkalinity (pH).
 1. Obtain instructions if test results are not within limits recommended by fluid-applied flooring manufacturer.

3.02 PREPARATION

- A. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.
- B. Prepare concrete surfaces according to ICRI 310.2R.
- C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Grind irregularities above the surface level. Prohibit traffic until filler is cured.
- D. Vacuum clean substrate.
- E. Apply primer to surfaces required by flooring manufacturer.

3.03 INSTALLATION - FLOORING

- A. Apply in accordance with manufacturer's instructions.
- B. Apply each coat to minimum thickness required by manufacturer.
- C. Finish to smooth level surface.

3.04 PROTECTION

- A. Prohibit traffic on floor finish for 48 hours after installation.
- B. Barricade area to protect flooring until fully cured.

END OF SECTION

**SECTION 09 9113
EXTERIOR PAINTING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Exposed surfaces of steel lintels and ledge angles.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Floors, unless specifically indicated.
 - 6. Brick, glass unit masonry, architectural concrete, cast stone, integrally colored plaster and stucco.
 - 7. Glass.
 - 8. Concealed pipes, ducts, and conduits.

1.02 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.03 REFERENCE STANDARDS

- A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2014.
- B. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; current edition, www.paintinfo.com.
- C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition, www.paintinfo.com.
- D. SSPC-SP 1 - Solvent Cleaning; 2015.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.

2. Extra Paint and Finish Materials: 5 gallons of each color; from the same product run, store where directed.
3. Label each container with color in addition to the 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.

1.06 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, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
 1. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
 1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
 2. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 3. 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.
 4. Supply each paint material in quantity required to complete entire project's work from a single production run.

5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.
- B. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- C. Colors: As indicated on drawings.

2.03 PAINT SYSTEMS - EXTERIOR

- A. Paint E-OP - Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including concrete masonry units, fiber cement siding, and primed metal.
 1. Two top coats and one coat primer.
 2. Top Coat(s): Exterior Latex; MPI #10, 11, 15, 119, or 214.
 - a. Products:
 - 1) Sherwin-Williams SuperPaint Exterior.
 - 2) Substitutions: Section 01 6000 - Product Requirements.
 3. Primer: As recommended by top coat manufacturer for specific substrate.

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- E. Test shop-applied primer for compatibility with subsequent cover materials.
- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 1. Masonry, Concrete, and Concrete Masonry Units: 12 percent.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.
- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Masonry:

1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 2. Prepare surface as recommended by top coat manufacturer.
 3. Clean surfaces with pressurized water. Use pressure range of 600 to 1,500 psi at 6 to 12 inches. Allow to dry.
- H. Fiber Cement Siding: Remove dirt, dust and other foreign matter with a stiff fiber brush. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
- I. 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. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

3.03 APPLICATION

- A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- B. Apply each coat to uniform appearance.
- C. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.
- B. Owner will provide field inspection.

3.05 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

**SECTION 09 9123
INTERIOR PAINTING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 - 5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
 - 6. Floors, unless specifically indicated.
 - 7. Glass.
 - 8. Concealed pipes, ducts, and conduits.

1.02 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.03 REFERENCE STANDARDS

- A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2014.
- B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.
- C. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; current edition, www.paintinfo.com.
- D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition, www.paintinfo.com.
- E. SSPC-SP 1 - Solvent Cleaning; 2015.
- F. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 6000 - Product Requirements, for additional provisions.
2. Extra Paint and Finish Materials: 5 gallons of each color; from the same product run, store where directed.
3. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience and approved by manufacturer.

1.06 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, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
 1. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
- C. Primer Sealers: Same manufacturer as top coats.

2.02 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
 1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
 2. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 3. 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.
 4. Supply each paint material in quantity required to complete entire project's work from a single production run.
 5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

- B. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- C. Colors: As indicated on drawings.
 - 1. Extend colors to surface edges; colors may change at any edge as directed by Architect.

2.03 PAINT SYSTEMS - INTERIOR

- A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board and concrete masonry units.
 - 1. PNT-1, PNT-2, & PNT-5 (Ceilings).
 - 2. Two top coats and one coat primer.
 - 3. Top Coat(s): Interior Latex; MPI #43, 44, 52, 53, 54, or 114.
 - a. Products:
 - 1) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Eg-Shel. (MPI #52)
 - 2) Substitutions: Section 01 6000 - Product Requirements.
 - 4. Top Coat Sheen:
 - a. Flat: MPI gloss level 1; use this sheen for ceilings and other overhead surfaces.
 - b. Eggshell: MPI gloss level 3; use this sheen at all walls.
 - 5. Primer: As recommended by top coat manufacturer for specific substrate.
- B. Paint I-OP-MD-DT - Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals:
 - 1. PNT-4.
 - 2. Medium duty applications include door frames.
 - 3. Two top coats and one coat primer.
 - 4. Top Coat(s): Interior Alkyd, Water Based; MPI #167, 168, or 169.
 - a. Products:
 - 1) Sherwin-Williams ProMar 200 Waterbased Acrylic-Alkyd, Semi-Gloss.
 - 2) Substitutions: Section 01 6000 - Product Requirements.
 - 5. Top Coat Sheen:
 - a. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
 - 6. Primer: As recommended by top coat manufacturer for specific substrate.
- C. Paint I-OP-MD-WC - Medium Duty Vertical and Overhead: Including gypsum board.
 - 1. PNT-3, PNT-6 (Ceilings).
 - 2. Two top coats and one coat primer.
 - 3. Top Coat(s): Interior Epoxy-Modified Latex; MPI #115 or 215.
 - a. Products:
 - 1) Sherwin-Williams Waterbased Catalyzed Epoxy, Semi-Gloss.
 - 2) Substitutions: Section 01 6000 - Product Requirements.

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- E. Test shop-applied primer for compatibility with subsequent cover materials.
- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.
- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Masonry:
 - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 - 2. Prepare surface as recommended by top coat manufacturer.
 - 3. Clean surfaces with pressurized water. Use pressure range of 600 to 1,500 psi at 6 to 12 inches. Allow to dry.
- H. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- I. 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. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
 - 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

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 and recommendations in "MPI Architectural Painting Specification Manual".
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

- F. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.
- B. Owner will provide field inspection.

3.05 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

**SECTION 09 9300
STAINING AND TRANSPARENT FINISHING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Field application of transparent finishes.

1.02 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.03 REFERENCE STANDARDS

- A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2014.
- B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.
- C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition, www.paintinfo.com.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and catalog number, and general product category.
 - 2. MPI product number (e.g. MPI #33).
 - 3. Manufacturer's installation instructions.
 - 4. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
- C. Samples: Two samples on actual wood substrate to be finished indicating selected colors and sheens for each system.
 - 1. Samples to be reviewed on-site with the Architect.

1.05 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 stain or transparent finish, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Stain and Transparent Finish Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.06 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by manufacturer of stains and transparent finishes.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F above the dew point, or to damp or wet surfaces.
- D. Minimum Application Temperature: 50 degrees F unless required otherwise by manufacturer's instructions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide finishes from the same manufacturer to the greatest extent possible.
- B. Transparent Finishes:
 - 1. Behr Process Corporation: www.behr.com/#sle.
 - 2. Pittsburgh Paints: www.ppgpaints.com/#sle.
 - 3. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 STAINS AND TRANSPARENT FINISHES - GENERAL

- A. Finishes:
 - 1. Provide finishes capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Provide materials compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 - 3. Supply each finish material in quantity required to complete entire project's work from a single production run.
 - 4. Do not reduce, thin, or dilute finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

2.03 INTERIOR STAIN AND TRANSPARENT FINISH SYSTEMS

- A. Finish on Wood - Vertical Surfaces:
 - 1. One-coat stain.
 - 2. One-coat sealer.
 - 3. Stain: Semi-transparent stain for wood, water based; MPI #186.
 - a. Products:
 - 1) Behr Fast Drying Water-Based Wood Stain [B4500].
 - 2) Substitutions: Section 01 6000 - Product Requirements.
 - 4. Sealer: Water based, sanding sealer, clear.
 - a. Products:
 - 1) Behr Water-Based Pre-Stain Wood Conditioner [No.B2080].
 - 2) Substitutions: Section 01 6000 - Product Requirements.

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of finished surfaces.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of stains and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.

- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

3.03 APPLICATION

- A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- D. Sand wood surfaces lightly between coats to achieve required finish.
- E. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- F. Reinstall items removed prior to finishing.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for general requirements for field inspection.
- B. Architect will provide field inspection.

3.05 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

- A. Protect finishes until completion of project.

END OF SECTION

**SECTION 10 1419
DIMENSIONAL LETTER SIGNAGE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Dimensional letter signage - Injection Molded-plastic dimensional characters
- B. High Density Urethane Signage, County Seal.

1.02 SUBMITTALS

- A. See Section 01 3000 - 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.
- D. Selection Samples: Where materials, colors, and finishes are not specified, submit two sets of selection charts or chips.

1.03 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of experience.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Package dimensional letter signs as required to prevent damage before installation.
- B. Store under cover and elevated above grade.
- C. Store tape adhesive at a normal room temperature of 68 to 72 degrees F.

1.05 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 MANUFACTURERS

- A. Dimensional Characters:
 - 1. FASTSIGNS International, Inc: www.fastsigns.com/#sle.
 - 2. Inpro Corporation: www.inprocorp.com/#sle.
 - 3. ASI Sign Systems, Inc.: www.asisignage.com.
 - 4. Gemini Incorporated: www.geminimade.com/signage/.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DIMENSIONAL LETTERS

- A. Applications: Building identification, Address.
 - 1. Use individual plastic letters.
 - 2. Mounting Location: Exterior as indicated on drawings.
- B. Plastic Letters:
 - 1. Material: Injection molded plastic.
 - 2. Thickness: As indicated on drawings.
 - 3. Letter Height: As indicated on drawings.
 - 4. Text and Typeface:

- a. Character Font: Helvetica, Arial, or other sans serif font.
- b. Character Case: Upper case only.
- 5. Finish: Semi-gloss.
- 6. Color: As selected by the Architect.
- 7. Mounting: Concealed screws.

2.03 HIGH DENSITY URETHANE SIGNAGE

- A. Cast with uniform faces, sharp corners, and precisely formed lines and profiles.
- B. Manufacturers:
 - 1. By the same manufacturer as the Dimensional Letters.
- C. Size: 24" high, 24" wide, 3" thickness.
- D. Finish: Custom-painted with Horry County Seal Logo coloration.
 - 1. All finishes to be suitable for exterior application.
- E. Mounting: Concealed fasteners.

2.04 ACCESSORIES

- A. Concealed Screws: Noncorroding metal; stainless steel, galvanized steel, chrome plated, or other.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. 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.
- C. Protect from damage until completion of construction; repair or replace damaged items.

END OF SECTION

SECTION 10 2800
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Commercial toilet accessories.
- B. Commercial shower and bath accessories.
- C. Utility room accessories.
- D. Grab bars.

1.02 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ASTM C1036 - Standard Specification for Flat Glass; 2011.
- C. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- D. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2018.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with the placement of internal wall reinforcement to receive anchor attachments.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Bradley.
- B. Commercial Toilet, Shower, and Bath Accessories:
 - 1. American Specialties, Inc: www.americanspecialties.com/#sle.
 - 2. Bradley Corporation: www.bradleycorp.com/#sle.
 - 3. Bobrick: www.bobrick.com.
 - 4. Substitutions: Section 01 6000 - Product Requirements.

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.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
- B. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

2.03 COMMERCIAL TOILET ACCESSORIES

- A. Toilet Paper Dispenser: Double roll, surface mounted bracket type, stainless steel.
 - 1. Products:
 - a. Bradley; Model #5235.
 - b. Substitutions: Section 01 6000 - Product Requirements.
- B. Paper Towel Dispenser: Folded paper type, stainless steel, fully-recessed, and tumbler lock.
 - 1. Capacity: 400 multifold minimum.

2. Products:
 - a. Bradley; Model #2442.
 - b. Substitutions: Section 01 6000 - Product Requirements.
- C. Soap Dispenser: Liquid soap dispenser, deck-mounted on vanity, with polyethylene container concealed below deck; piston and 4 inch spout of stainless steel with bright polished finish; chrome-plated deck escutcheon.
 1. Minimum Capacity: 16 ounces.
 2. Products:
 - a. Bradley; Model #6324.
 - b. Substitutions: Section 01 6000 - Product Requirements.
- D. Mirrors: Stainless steel framed, 1/4 inch thick tempered safety glass; ASTM C1048.
 1. Size: As indicated on drawings.
 2. Frame: 0.05 inch angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
 3. Products:
 - a. Bradley; Model 780-2436-2.
 - b. Substitutions: Section 01 6000 - Product Requirements.
- E. Grab Bars: Stainless steel, smooth surface.
 1. Standard Duty Grab Bars:
 - a. Push/Pull Point Load: 250 pound-force, minimum.
 - b. Dimensions: 1 1/2 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.
 - e. Products:
 - 1) Bradley: 812 Series.
 - 2) Substitutions: Section 01 6000 - Product Requirements.

2.04 COMMERCIAL SHOWER AND BATH ACCESSORIES

- A. Shower Curtain Rod: Stainless steel tube, 1 inch outside diameter, 0.04 inch wall thickness, satin-finished, with 3 inch outside diameter, minimum 0.04 inch thick satin-finished stainless steel flanges, for installation with exposed fasteners.
 1. Products:
 - a. Bradley #9538.
 - b. Substitutions: Section 01 6000 - Product Requirements.
- B. Shower Curtain:
 1. Material: Opaque vinyl, 0.008 inch thick, matte finish, with antibacterial treatment, flameproof and stain-resistant.
 2. Size: 60 x 72 inches, hemmed edges.
 3. Grommets: Stainless steel; pierced through top hem on 6 inch centers.
 4. Shower Curtain Hooks: Chrome-plated or stainless steel spring wire designed for snap closure.
 5. Products:
 - a. Bradley #9533- Curtain.
 - b. Bradley #9536 - Hooks.
 - c. Substitutions: Section 01 6000 - Product Requirements.
- C. Robe Hook: Heavy-duty stainless steel, single-prong, rectangular-shaped bracket and backplate for concealed attachment, satin finish.
 1. Products:
 - a. Bradley #9114.

- b. Substitutions: Section 01 6000 - Product Requirements.

2.05 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: 30 inches.
 - 5. Products:
 - a. Bradley #9983.
 - b. Substitutions: Section 01 6000 - Product Requirements.

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.
- D. See Section 09 2116 for installation of blocking, reinforcing plates, and concealed anchors in walls and ceilings.

3.02 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.03 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: 34" to centerline of grab bar, or as indicated on drawings.
 - 2. Other Accessories: As indicated on drawings.

3.04 PROTECTION

- A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

**SECTION 10 4400
FIRE PROTECTION SPECIALTIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.

1.02 REFERENCE STANDARDS

- A. FM (AG) - FM Approval Guide; current edition.
- B. NFPA 10 - Standard for Portable Fire Extinguishers; 2022.
- C. UL (DIR) - Online Certifications Directory; Current Edition.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide extinguisher operational features.
- C. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fire Extinguishers:
 - 1. Activar Construction Products Group, Inc. - JL Industries: www.activarcpg.com/#sle.
 - 2. Ansul, a Tyco Business: www.ansul.com/#sle.
 - 3. Potter-Roemer: www.potterroemer.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Fire Extinguisher Cabinets and Accessories:
 - 1. Larsen's Manufacturing Co: www.larsensmfg.com/#sle.
 - 2. Potter-Roemer: www.potterroemer.com/#sle.
 - 3. Substitutions: See Section 01 6000 - 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. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
 - 1. Class: A:B:C type.
 - 2. Size: 2.5 pound.
 - 3. Finish: Baked polyester powder coat, red color.

2.03 FIRE EXTINGUISHER CABINETS

- A. Cabinet Configuration: Semi-recessed type.
- B. Door Glazing: Acrylic plastic, clear, 1/8 inch thick, full view bubble shape and set in resilient channel glazing gasket.
- C. Finish of Cabinet Exterior Trim and Door: Baked enamel, White color.
- D. Finish of Cabinet Interior: White colored enamel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. 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.

END OF SECTION

SECTION 10 5113 METAL LOCKERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal lockers.

1.02 REFERENCE STANDARDS

- A. ASTM A879/A879M - Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface; 2012.
- B. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's published data on locker construction, sizes, and accessories.
- C. Shop Drawings: Indicate locker plan layout, numbering plan and combination lock code.
- D. Samples: Submit two samples 3 by 3 inches in size showing color and finish of metal locker material.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Protect locker finish and adjacent surfaces from damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Lockers:
 - 1. ASI Storage Solutions: www.asi-storage.com/#sle.
 - 2. List Industries, Inc: www.listindustries.com/#sle.
 - 3. Penco Products, Inc: www.pencoproducts.com/#sle.
 - 4. Republic Storage Systems Co: www.republicstorage.com/#sle.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 LOCKER APPLICATIONS

- A. Athletic Lockers: Metal lockers, free-standing with matching closed base.
 - 1. Width: 24 inch.
 - 2. Depth: 24 inches.
 - 3. Height: 72 inches.
 - 4. Configuration: Two tier.
 - 5. Ventilation: Perforated side panels and doors.
 - 6. Locking: Built-in combination locks.
 - 7. Provide sloped top.
 - 8. Color: To be selected from manufacturer's full range by Architect.

2.03 METAL LOCKERS

- A. Locker Case Construction:
 - 1. Heavy-Duty, Welded Construction: Made of formed and welded together sheet steel; metal edges finished smooth without burrs; baked enamel or powder coat finished inside and out.
 - a. Assembly: Do not use bolts, screws, or rivets to assemble locker bodies.

- b. Locker Body Components: Formed and flanged from steel sheet of the following type and minimum thicknesses:
 - 1) Unperforated Steel Sheet: Commercial Steel (CS), Type B, supplied for exposed applications and complying with ASTM A1008/A1008M and the following:
 - (a) Zinc-Coated by the Electrolytic Process: Comply with ASTM A879/A879M, coating designation 30Z.
 - (b) Perforations: Manufacturer's standard pattern of square holes.
 - 2) Body and Shelves: 16 gauge, 0.0598 inch.
 - 3) Backs: 18 gauge, 0.0478 inch.
 - 4) Base: 18 gauge, 0.0478 inch.
 - (a) Height: 4 inches.
 - c. Frames: Formed channel shape, welded and ground flush, welded to body, resilient gaskets and latching for quiet operation.
 - 1) Door Frame: 16 gauge, 0.0598 inch, minimum.
 - B. Latches and Door Handles: Manufacturer's standard.
 - C. Sloped Top: 20 gauge, 0.0359 inch, with closed ends.
 - D. Number Plates: Provide oval shaped aluminum plates. Form numbers 3/8 inch high of block font style with ADA designation, in contrasting color.
 - E. Locks: Locker manufacturer's standard type indicated in Applications article above.
 - F. Built-In Combination Locks:
 - 1. Built-In Combination Lock: Single-dial combination lock.
 - a. Single-Dial Numerical Combination Lock: Three-number dialing lock, key-controlled, capable of minimum five combination changes with key.
 - b. Latch: Deadbolt.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install lockers plumb and square.
- C. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 pounds.
- D. Install end panels, filler panels, and sloped tops.
- E. Install fittings if not factory installed.
- F. Replace components that do not operate smoothly.

3.02 CLEANING

- A. Clean locker interiors and exterior surfaces.

END OF SECTION

**SECTION 10 5613
METAL STORAGE SHELVING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Four post shelving.

1.02 RELATED REQUIREMENTS

- A. Section 09 2116 - Gypsum Board Assemblies: Blocking and reinforcement in walls for anchoring shelving units.

1.03 REFERENCE STANDARDS

- A. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Rated uniform shelf loads.
 - 2. Details of shelving assemblies, including reinforcement.
 - 3. Accessories.
 - 4. Substrate preparation instructions and recommendations.
 - 5. Specimen warranty.
- C. Shop Drawings: Indicate location, type, and layout of shelving, including lengths, heights, and aisle layout, and relationship to adjacent construction.
 - 1. Indicate methods of achieving specified anchoring requirements.
- D. Executed warranty.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inspect for dents, scratches, or other damage. Replace damaged units.
- B. Store in manufacturer's unopened packaging until ready for installation.
- C. Store under cover and elevated above grade.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Manufacturer Warranty: Provide 1-year manufacturer warranty for rust, corrosion, and manufacturing defects. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Four Post Shelving:
 - 1. Nexel Shelving; www.nexelshelvingusa.com.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 SHELVING - GENERAL

- A. Seismic Design: Design for Seismic Zone 3, in accordance with ASCE 7, Section 9.
- B. Anchors: Provide anchoring hardware to secure each shelving unit to floor and wall.
 - 1. Provide hardware of type recommended by manufacturer for substrate.

2.03 FOUR POST SHELVING

- A. Four Post Shelving: Steel post-and-shelf type with shelving brackets, shelving surfaces, and accessories as specified.
 - 1. Unit Size: 18 inches deep x 48 inches wide.
 - 2. Shelf Capacity: Uniform distributed load of 50 psf, minimum.
 - 3. Finish: Stainless Steel.
 - 4. Number of Units: As indicated on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate is level and that clearances are as specified.
- B. Do not begin installation until substrates have been properly prepared.
- C. 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 the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Anchor and reinforce as specified, as indicated on drawings, and as recommended by manufacturer.
- C. Install shelving with shelf surfaces level and vertical supports plumb; adjust feet and bases as required.
- D. Out-Of-Square Tolerance - Four Post Shelving: Maximum of 1/8 inch difference in distance between bottom shelf and canopy top, measured along any post in any direction.

3.04 CLEANING

- A. Clean shelving and surrounding area after installation.

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 10 7500 FLAGPOLES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum Flagpoles.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete base and foundation construction.

1.03 REFERENCE STANDARDS

- A. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube; 2022.
- B. NAAMM FP 1001 - Guide Specifications for Design Loads of Metal Flagpoles; 2007.

1.04 SUBMITTALS

- A. See Section 01 3000 - 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. Concord American Flagpole; Internal - Independence: www.concordamericanflagpole.com/#sle.
 - 2. Morgan-Francis Flagpoles & Accessories: www.morgan-francis.com/#sle.
 - 3. Pole-Tech Co, Inc: www.poletech.com/#sle.
 - 4. Substitutions: See Section 01 6000 - 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: Internal type, cleat.
- B. Performance Requirements:
 - 1. Wind Pressure Loading on Flagpole with Flag: Resistant without permanent deformation to 110 miles/hr wind speed, in accordance with NAAMM FP 1001; the factor of safety used is 2.5.

2.03 POLE MATERIALS

- A. Aluminum: ASTM B241/B241M , 6063 alloy , T6 temper.

2.04 ACCESSORIES

- A. Finial Ball: Aluminum, 6 inch diameter.

- B. Truck Assembly: Cast aluminum; revolving, stainless steel ball bearings, non-fouling.
- C. Cleats: 9 inch size, aluminum with galvanized steel fastenings, one per halyard.
- D. Cleat Box: Aluminum, with built-in hinge and hasp assembly, attached to pole with tamper proof screws inside box.
- E. Halyard: 5/16 inch diameter nylon, braided, white.

2.05 MOUNTING COMPONENTS

- A. Foundation Tube Sleeve: AASHTO M 36, corrugated 16 gauge, 0.0598 inch steel, galvanized, depth as required to comply with wind loading requirements above.
- B. Pole Base Attachment: Flush; steel base with base cover.
- C. Lightning Ground Cable: Copper No. 6 AWG, soft drawn.

2.06 FINISHING

- A. Metal Surfaces in Contact With Concrete: Asphaltic paint.
- B. Aluminum: Mill finish.
- C. Stainless Steel: No. 4 satin finish.

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.
- B. Fill foundation tube sleeve with concrete specified in Section 03 3000.

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 3013
RESIDENTIAL APPLIANCES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Kitchen appliances.
- B. Laundry appliances.

1.02 REFERENCE STANDARDS

- A. UL (DIR) - Online Certifications Directory; Current Edition.

1.03 SUBMITTALS

- A. See Section 01 3000 - 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.

1.04 QUALITY ASSURANCE

- A. Electric Appliances: Listed and labeled by UL (DIR) and complying with NEMA Standards (National Electrical Manufacturers Association).

1.05 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide two (2) year manufacturer warranty on all materials and/or workmanship from the Date of Substantial Completion.
- C. Provide five (5) year manufacturer warranty on refrigeration system of refrigerators.

PART 2 PRODUCTS

2.01 KITCHEN APPLIANCES

- A. Provide Equipment Eligible for Energy Star Rating: Energy Star Rated.
- B. Finishes: All appliances are to have a factory-applied black finish.
- C. Range: General Electric, model number JS630DFBB.
- D. Microwave Oven: General Electric, model number JNM316DJBB.
- E. Refrigerator / Freezer: General Electric, model number GTS22KMNRDS.
- F. Dishwasher: General Electric, model number GDF650SGJBB.
- G. Disposal: General Electric, model number GFC1020F.

2.02 LAUNDRY APPLIANCES

- A. Provide Equipment Eligible for Energy Star Rating: Energy Star Rated.
- B. Washer: General Electric, model number GTW810SSJWS.
- C. Dryer: General Electric, model number GTD65EBSJWS.

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.

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 3600 COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Solid Surface & Quartz Countertops for architectural cabinet work.
- B. Solid Surface Window Sills.

1.02 RELATED REQUIREMENTS

- A. Section 06 4100 - Architectural Wood Casework.

1.03 REFERENCE STANDARDS

- A. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.
- B. ISFA 3-01 - Classification and Standards for Quartz Surfacing Material; 2013.
- C. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- D. NSI (DSDM) - Dimensional Stone Design Manual, Version VIII; 2016.

1.04 SUBMITTALS

- A. See Section 01 3000 - 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. Installation Instructions: Manufacturer's installation instructions and recommendations.
- F. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of 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. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
 - 1. Flat Sheet Thickness: 1/2 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) Wilsonart: www.wilsonart.com/#sle.
 - 2) Substitutions: See Section 01 6000 - Product Requirements.
 - b. Color and Pattern: As indicated on drawings.
 3. Other Components Thickness: 1/2 inch, minimum.
 4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; square edge.
 5. Back and End Splashes: Same sheet material, square top.
 6. Skirts: As indicated on drawings.
 7. Fabricate in accordance with manufacturer's standard requirements.
- B. Natural Quartz and Resin Composite Countertops: Sheet or slab of natural quartz and plastic resin over continuous substrate.
1. Flat Sheet Thickness: 1-1/4 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) Wilsonart: www.wilsonart.com/#sle.
 - 2) Corian; www.corianquartz.com.
 - 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. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; square edge.
 5. Back and End Splashes: Same sheet material, square top.
 6. Skirts: As indicated on drawings.
 7. Fabricate in accordance with manufacturer's standard requirements.

2.02 MATERIALS

- A. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- B. Joint Sealant: Mildew-resistant silicone sealant, clear.

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 or where shown differently on the Drawings.
 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. 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 21 0000

AUTOMATIC SPRINKLER FIRE PROTECTION

PART 1 - GENERAL

1.01 GENERAL:

1.01.1 The General Conditions, Supplementary Mechanical and Electrical Conditions, and Special Conditions are hereby made a part of this Division to the same extent as if written in full, and this Contractor shall observe all of the requirements thereof insofar as they pertain and apply to his work.

1.02 SCOPE OF WORK:

1.02.1 It is the intent of these specifications to provide a basis for bidding to cover the engineering, design and complete installation of the wet type automatic fire sprinkler and hose cabinet systems. The Sprinkler Contractor shall be responsible for providing an Engineer of Record to certify all aspects of the design. The Sprinkler Contractor shall design, furnish and install the entire sprinkler system, from the suction side of the fire pumps (if needed) to the final installation of each head.

1.02.2 It shall be a specific requirement that insofar as possible, all sprinkler system mains and branches shall be installed as close as possible to the structural systems.

1.02.3 All piping for all systems shall be coordinated with lighting fixtures, air-conditioning ducts, piping and air handling units. Sprinkler heads shall be located as closely as possible to the center of the ceiling tiles aligned with adjacent light fixtures. Final exact locations shall be verified with the Architect upon shop drawings submittal and immediately prior to installation.

1.03 WORK EXCLUDED:

1.03.1 Painting of exposed sprinkler system piping, controls, valves, etc., shall be accomplished under the work of the Painting Section.

1.03.2 Caulking and sealing of sleeves for piping through floors and walls shall be included under the scope of the work of Caulking and Sealing. The installation of all sleeves regardless of location, and the insulation of sprinkler system lines passing through insulated walls and partitions shall be in this Section of the work as specified hereinafter.

1.04 CODE REQUIREMENTS

All aspects of design, installation and equipment shall conform in all respects to the rules, regulations and requirements of the State Fire Marshall, South Carolina and any local agencies.

1.05 SHOP DRAWINGS AND APPROVALS:

The Automatic Sprinkler Subcontractor shall prepare or have prepared complete shop drawings, dimensional working drawings, and approval sheets for the entire installation. First submit to the Architect for approval of the basic arrangement and layout. Such submittal will be noted for corrections or changes if required. Submit in four (4) copies and/or electronic format. The corrected drawings shall then be submitted by the Subcontractor to the South Carolina State Fire Marshall and any required local agencies. Upon securing written approval of these agencies, submit to the Architect five (5) copies of all drawings, stamped as approved, by each of the agencies.

PART 2 - PRODUCTS

2.01 MATERIALS AND INSTALLATION:

2.01.1 The materials and installation shall be as follows:

- A. Automatic Sprinkler Heads - Upright or pendent, of proper temperature rating, shall be installed throughout the areas as required by the insurance authority. Where furred or finished ceilings occur, the piping shall be installed above the ceiling with the sprinkler heads nipped through the ceiling and set in either metal or white plastic escutcheon plates approximately 1 inch deep. Sprinkler shall be chrome finish in all finished ceilings.
 - B. Sprinkler Riser - Shall be equipped with a variable pressure alarm valve including retarding chamber, drain valve, standard trimming and gauges.
 - C. Water Motor Gongs - Shall be furnished for alarm valve and dry pipe valve and located as required.
 - D. Drains - Shall be piped to outside of building as part of this work, except in locations where a drain fixture is provided by the plumbing design specifically.
 - E. Piping System Valves - Shall be approved for fire protection piping systems and shall be installed as required by the NFPA.
 - F. Hose Cabinets - Shall be equal to Allenco 7169 with 2-1/2" to 1-1/2" reducer, 1-1/2" valve, 75 ft. linen hose with fox nozzle and type S door.
 - G. Roof Outlets - Shall be equal to Allenco #14B brass double hydrant 2-1/2" X 2-1/2" X 4", two caps and chains.
 - H. Fire Department Connections - Shall be equal to Allenco 231 with two-way 2-1/2" X 2-1/2" X 6" wall siamese connection listed as "Standpipe Automatic Sprinkler". Connection shall be chrome plated.
 - I. Overhead Piping - Shall be standard weight wrought steel pipe. Fittings shall be cast iron, screwed. Pipe and fittings shall be UL listed for use in sprinkler work. Piping layout shall be such as to avoid, wherever possible, conflicts or interference with building lighting, multiple pipe runs and mechanical equipment, including refrigeration equipment and piping not in the contract. Locations of these items will be shown or called for on the drawings, or will be available from the Refrigeration Contractor.
- In all storage areas it is intended that maximum headroom be maintained.
- J. Hangers - Shall be installed as required and shall be UL listed for use in a sprinkler system. Hangers shall be spaced in accordance with the requirements of the NFPA.
 - K. Sprinkler Cabinet - One cabinet with 6 sprinkler heads and a head wrench shall be installed in the project where directed. Sprinklers shall be representative of those installed.
 - L. Underground Piping - Shall be Class 150 cast iron pipe, with mechanical joints, tar coated and UL approved. Fittings for this pipe shall be mechanical joint type, Class 250, tar coated. Underground piping shall be braced and clamped in an approved manner acceptable to the Rating

Bureau. "Blue Brute" Class 150 as manufactured by Johns/Manville may be used if permitted by local codes and authorities. Provide concrete thrust blocks at each change in direction and at all tees, plugs, caps, and bends in strict accordance with NFPA 24, Section 8-6.2 and Appendix B.

M. Trenching and Backfill - Sprinkler lines included under this section shall conform to applicable portions of the specifications for excavation and backfill for buildings, including compaction and soils engineer control.

PART 3 - EXECUTION

3.01 TESTING:

3.01.1 All piping shall be tested for two hours at 200 psi in the presence of the Owner's representative and the inspector for the Rating Bureau and the Fire Marshall's representative, and shall be proved tight. Unsatisfactory workmanship shall be corrected to the satisfaction of the above mentioned persons. Defective materials shall be replaced with new materials and the defective materials removed from the premises.

3.02 GUARANTEE:

3.02.1 All materials and workmanship installed under this section of the specifications shall be guaranteed for a period of one year from the date of acceptance of the installation by the Owner. Any defects noted within this period shall be promptly repaired by the Contractor at no expense to the Owner. The Contractor shall also be responsible for any damage to other work caused by leaks or breaks in work installed under this Contract during the period of construction and the guarantee period.

END OF SECTION

SECTION 22 0501

COMMON PLUMBING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Common requirements and procedures for plumbing systems.
 - 2. Responsibility for proper operation of electrically powered equipment furnished under this Division.
 - 3. Furnish and install sealants relating to installation of systems installed under this Division.
- B. Products Furnished But Not Installed Under This Section:
 - 1. Sleeves, inserts, supports, and equipment for plumbing systems installed under other Sections.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's catalog data for each manufactured item.
 - 1) Provide section in submittal for each type of item of equipment. Include Manufacturer's catalog data of each manufactured item and enough information to show compliance with Contract Document requirements. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
 - 2) Include name, address, and phone number of each supplier.
- B. Informational Submittals:
 - 1. Qualification Statement:
 - a. Plumbing Subcontractor:
 - 1) Provide Qualification documentation if requested by Architect or Owner.
 - b. Installer:
 - 1) Provide Qualification documentation if requested by Architect or Owner.
- C. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Operations and Maintenance Data (Modify and add to requirements of Section 01 7800):
 - 1) At beginning of PLUMBING section of Operations And Maintenance Manual, provide master index showing items included:
 - a) Provide name, address, and phone number of Architect, Architect's Mechanical Engineer, General Contractor, and Plumbing subcontractor.
 - b) Identify maintenance instructions by using same equipment identification used in Contract Drawings. Maintenance instructions shall include:
 - (1) List of plumbing equipment used indicating name, model, serial number, and nameplate data of each item together with number and name associated with each system item.
 - (2) Manufacturer's maintenance instructions for each piece of plumbing equipment installed in Project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance instructions.
 - c) Provide operating instructions to include:
 - (1) General description of fire protection system.

- (2) Step by step procedure to follow for shutting down system or putting system into operation.
- b. Warranty Documentation:
 - 1) Include copies of warranties required in individual Sections of Division 22.

1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Perform work in accordance with applicable provisions of Plumbing Codes applicable to Project. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
 - 2. In case of differences between building codes, laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Notify Architect in writing of such differences before performing work affected by such differences.
 - 3. Identification:
 - a. Motor and equipment name plates as well as applicable UL / ULC and AGA / CGA labels shall be in place when Project is turned over to Owner.
- B. Qualifications. Requirements of Section 01 4301 applies, but not limited to following:
 - 1. Plumbing Subcontractor:
 - a. Company specializing in performing work of this section.
 - 1) Minimum five (5) years experience in plumbing installations.
 - 2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
 - b. Upon request, submit documentation.
 - 2. Installer:
 - a. Licensed for area of Project.
 - b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
 - c. Upon request, submit documentation.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Accept valves on site in shipping containers with labeling in place.
 - 2. Provide temporary protective coating on cast iron and steel valves.
 - 3. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- B. Storage And Handling Requirements:
 - 1. In addition to requirements specified in Division 01, stored material shall be readily accessible for inspection by Architect until installed.
 - 2. Store items subject to moisture damage in dry, heated spaces.

1.5 WARRANTY

- A. Manufacturer Warranty:
 - 1. Provide certificates of warranty for each piece of equipment made out in favor of Owner.
- B. Special Warranty:
 - 1. Guarantee plumbing systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.
 - 2. If plumbing sub-contractor with offices located more than 150 miles from Project site is used, provide service / warranty work agreement for warranty period with local plumbing sub-contractor approved by Architect. Include copy of service / warranty agreement in warranty section of Operation And Maintenance Manual.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Components shall bear Manufacturer's name and trade name. Equipment and materials of same general type shall be of same make throughout work to provide uniform appearance, operation, and maintenance.
- B. Pipe And Pipe Fittings:
 - 1. Weld-O-Let and Screw-O-Let fittings are acceptable.
 - 2. Use domestic made pipe and pipe fittings on Project, except non-domestic made cast iron pipe and fittings by MATCO-NORCA are acceptable.
- C. Sleeves:
 - 1. General:
 - a. Two sizes larger than bare pipe or insulation on insulated pipe.
 - 2. In Concrete And Masonry:
 - a. Sleeves through outside walls, interior shear walls, and footings shall be schedule 80 black steel pipe with welded plate.
 - 3. In Framing And Suspended Floor Slabs:
 - a. Standard weight galvanized iron pipe, Schedule 40 PVC, or 14 ga galvanized sheet metal.
- D. Valves:
 - 1. Valves of same type shall be of same manufacturer.

PART 3 - EXECUTION

3.1 INSTALLERS

- A. Acceptable Installers:
 - 1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

- A. Drawings:
 - 1. Plumbing Drawings show general arrangement of piping, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
 - 2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over Plumbing Drawings.
 - 3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.
- B. Verification Of Conditions:
 - 1. Examine premises to understand conditions that may affect performance of work of this Division before submitting proposals for this work. Examine adjoining work on which plumbing work is dependent for efficiency and report work that requires correction.
 - 2. Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items,

- be responsible for specified capacities and for ensuring that items to be furnished will fit space available.
3. Check that slots and openings provided under other Divisions through floors, walls, ceilings, and roofs are properly located. Perform cutting and patching caused by neglecting to coordinate with Divisions providing slots and openings at no additional cost to Owner.
 4. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.

3.3 PREPARATION

- A. Changes Due To Equipment Selection:
1. Where equipment specified or otherwise approved requires different arrangement or connections from that shown in Contract Documents, submit drawings showing proposed installations.
 2. If proposed changes are approved, install equipment to operate properly and in harmony with intent of Contract Documents. Make incidental changes in piping, ductwork, supports, installation, wiring, heaters, panelboards, and as otherwise necessary.
 3. Provide additional motors, valves, controllers, fittings, and other equipment required for proper operation of systems resulting from selection of equipment.
 4. Be responsible for proper location of rough-in and connections provided under other Divisions.

3.4 INSTALLATION

- A. Interface With Other Work:
1. Furnish exact location of electrical connections and complete information on motor controls to installer of electrical system.
 2. Furnish sleeves, inserts, supports, and equipment that are to be installed by others in sufficient time to be incorporated into construction as work proceeds. Locate these items and confirm that they are properly installed.
- B. Cut carefully to minimize necessity for repairs to previously installed or existing work. Do not cut beams, columns, or trusses.
- C. Locating Equipment:
1. Arrange pipes and equipment to permit ready access to valves, cocks, unions, traps, and to clear openings of doors and access panels.
 2. Adjust locations of pipes, equipment, and fixtures to accommodate work to interferences anticipated and encountered.
 3. Install plumbing work to permit removal of equipment and parts of equipment requiring periodic replacement or maintenance without damage to or interference with other parts of equipment or structure.
 4. Determine exact route and location of each pipe before fabrication.
 - a. Right-Of-Way:
 - 1) Lines that pitch shall have right-of-way over those that do not pitch. For example, plumbing drains shall normally have right-of-way.
 - 2) Lines whose elevations cannot be changed shall have right-of-way over lines whose elevations can be changed.
 - b. Offsets, Transitions, and Changes in Direction:
 - 1) Make offsets, transitions, and changes in direction in pipes as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
 - 2) Furnish and install all traps, air vents, sanitary vents, and devices as required to effect these offsets, transitions, and changes in direction.
- D. Penetration Firestops:
1. Install Penetration Firestop System appropriate for penetration at plumbing systems penetrations through walls, ceilings, roofs, and top plates of walls.

- E. Sealants:
1. Seal openings through building exterior caused by penetrations of elements of plumbing systems.
 2. Furnish and install acoustical sealant to seal penetrations through acoustically insulated walls and ceilings.
- F. Furnish and install complete system of piping, valved as indicated or as necessary to completely control entire apparatus:
1. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at site. This does not relieve this Division from responsibility for proper installation of plumbing systems.
 2. Arrange piping to not interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings:
 - a. Arrange so as to facilitate removal of tube bundles.
 - b. Provide accessible flanges or ground joint unions, as applicable for type of piping specified, at connections to equipment and on bypasses.
 - 1) Make connections of dissimilar metals with di-electric unions.
 - 2) Install valves and unions ahead of traps and strainers. Provide unions on both sides of traps.
 - c. Do not use reducing bushings, bull head tees, close nipples, or running couplings. Street elbows are allowed only on potable water pipe **3/4 inch** in diameter and smaller.
 - d. Install piping systems so they may be easily drained
 - e. Install piping to insure noiseless circulation.
 - f. Place valves and specialties to permit easy operation and access. Valves shall be regulated, packed, and glands adjusted at completion of work before final acceptance.
 3. Do not install piping in shear walls.
 4. Cut piping accurately to measurements established at site. Remove burr and cutting slag from pipes.
 5. Work piping into place without springing or forcing. Make piping connections to pumps and other equipment without strain at piping connection. Remove bolts in flanged connections or disconnect piping to demonstrate that piping has been so connected, if requested.
 6. Make changes in direction with proper fittings.
- G. Sleeves:
1. Do not place sleeves around soil, waste, vent, or roof drain lines passing through concrete slabs on grade.
 2. Provide sleeves around pipes passing through concrete or masonry floors, walls, partitions, or structural members. Seal sleeves with specified sealants. .
 3. Sleeves through floors shall extend **1/4 inch** above floor finish in mechanical equipment rooms above basement floor. In other rooms, sleeves shall be flush with floor.
 4. Sleeves through floors and foundation walls shall be watertight.
- H. Escutcheons:
1. Provide spring clamp plates where pipes run through walls, floors, or ceilings and are exposed in finished locations of building. Plates shall be chrome plated heavy brass of plain pattern and shall be set tight on pipe and to building surface.

3.5 REPAIR / RESTORATION

- A. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it:
1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown.
 2. Surface finishes shall exactly match existing finishes of same materials.

3.6 FIELD QUALITY CONTROL

- A. Field Tests:
 - 1. Perform tests on plumbing piping systems. Furnish devices required for testing purposes.
- B. Non-Conforming Work:
 - 1. Replace material or workmanship proven defective with sound material at no additional cost to Owner.
 - 2. Repeat tests on new material, if requested.

3.7 CLEANING

- A. Remove dirt, grease, and other foreign matter from each length of piping before installation:
 - 1. After each section of piping used for movement of water or steam is installed, flush with clean water, except where specified otherwise.
 - 2. Arrange temporary flushing connections for each section of piping and arrange for flushing total piping system.
 - 3. Provide temporary cross connections and water supply for flushing and drainage and remove after completion of work.
- B. Clean exposed piping, equipment, and fixtures. Remove stickers from fixtures and adjust flush valves.

3.8 CLOSEOUT ACTIVITIES

- A. Instruction of Owner:
 - 1. Instruct building maintenance personnel and Stake Physical Facilities Representative in operation and maintenance of plumbing systems utilizing Operation And Maintenance Manual when so doing.
 - 2. Conduct instruction period after Substantial Completion inspection when systems are properly working and before final payment is made.

3.9 PROTECTION

- A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system. Cap or plug open ends of pipes and equipment to keep dirt and other foreign materials out of system. Do not use plugs of rags, wool, cotton waste, or similar materials.

END OF SECTION

SECTION 22 0529

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Common hanger and support requirements and procedures for plumbing systems.
- B. Products Installed But Not Furnished Under This Section:
 - 1. Paint identification for gas piping used in HVAC equipment.
- C. Related Requirements:
 - 1. Section 05 0523: 'Metal Fastening' for quality and requirements for welding.
 - 2. Section 07 8400: 'Firestopping' for quality of Penetration Firestop Systems to be used on Project and submittal requirements.
 - 3. Sections Under 09 9000 Heading: Painting of mechanical items requiring field painting.
 - 4. Slots and openings through floors, walls, ceilings, and roofs provided under other Divisions in their respective materials.
 - 5. Section 23 0529: 'Hangers And Supports For HVAC Piping And Equipment' for gas piping used with HVAC equipment.
 - 6. Section 23 0553: 'Identification For HVAC Piping And Equipment' for paint identification of gas piping used with HVAC equipment.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's catalog data for each manufactured item.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Anvil International, Portsmouth, NH www.anvilintl.com.
 - b. Cooper B-Line, Highland, IL www.b-line.com.
 - c. Unistrut, Wayne, MI www.tyco-unistrut.com.
- B. Materials:
 - 1. Hangers, Rods, And Inserts
 - a. Galvanized and UL approved for service intended.
 - b. Support horizontal piping from hangers or on roller assemblies with channel supports, except where trapeze type hangers are explicitly shown on Drawings. Hangers shall have double nuts.
 - 1) Support insulated pipes **2 inches** in diameter and smaller with adjustable swivel ring hanger with insulation protection shield. Gauge and length of shield shall be in accordance with Anvil design data.
 - a) Type Two Acceptable Products:

- (1) Swivel Ring Hanger: Anvil Fig. 69.
 - (2) Insulation Protection Shield: Anvil Fig. 167.
 - (3) Equals by Cooper B-Line.
- c. Support rods for single pipe shall be in accordance with following table:

Rod Diameter	Pipe Size	Rod Diameter	Pipe Size
3/8 inch	2 inches and smaller	10 mm	50 mm and smaller
1/2 inch	2-1/2 to 3-1/2 inches	13 mm	64 mm to 88 mm
5/8 inch	4 to 5 inches	16 mm	100 mm to 125 mm
3/4 inch	6 inches	19 mm	150 mm

- d. Support rods for multiple pipe supported on steel angle trapeze hangers shall be in accordance with following table:

Rods		Number of Pipes per Hanger for Each Pipe Size				
Number	Diameter	2 Inch	2.5 Inch	3 Inch	4 Inch	5 Inch
2	3/8 Inch	Two	0	0	0	0
2	1/2 Inch	Three	Three	Two	0	0
2	5/8 Inch	Six	Four	Three	Two	0
2	5/8 Inch	Nine	Seven	Five	Three	Two
2	5/8 Inch	Twelve	Nine	Seven	Five	Three

- 1) Size trapeze angles so bending stress is less than 10,000 psi.
- e. Riser Clamps For Vertical Piping:
- 1) Type Two Acceptable Products:
 - a) Anvil Fig. 261.
 - b) Equals by Cooper B-Line.
- f. Concrete Inserts:
- 1) Individual Inserts:
 - a) Suitable for special nuts size 3/8 inch through 7/8 inch with yoke to receive concrete reinforcing rods, and with malleable iron lugs for attaching to forms.
 - b) Type Two Acceptable Products:
 - (1) Anvil Fig. 282.
 - (2) Equals by Cooper B-Line.
 - 2) Continuous Inserts:
 - a) Class Two Quality Standard: Equal to Unistrut P-3200 series.
- g. Steel Deck Bracket:
- 1) Class Two Quality Standard: Equal to Unistrut P1000 with clamp nut, minimum 6 inch length.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Piping:
1. Properly support piping and make adequate provisions for expansion, contraction, slope, and anchorage.
 - a. Except for underground pipe, suspend piping from roof trusses or clamp to vertical walls using Unistrut and clamps. Do not hang pipe from other pipe, equipment, or ductwork. Laying of piping on any building element is not allowed.
 - b. Supports For Horizontal Piping:
 - 1) Support metal piping at 96 inches on center maximum for pipe 1-1/4 inches or larger and 72 inches on center maximum for pipe 1-1/8 inch or less.
 - 2) Support thermoplastic pipe at 48 inches on center maximum.
 - 3) Support PEX pipe at 32 inches minimum on center.
 - 4) Provide support at each elbow. Install additional support as required.
 - c. Supports for Vertical Piping:
 - 1) Place riser clamps at each floor or ceiling level.

- 2) Securely support clamps by structural members, which in turn are supported directly from building structure.
 - 3) Provide clamps as necessary to brace pipe to wall.
- d. Insulate hangers for copper pipe from piping by means of at least two layers of Scotch 33 plastic tape.

END OF SECTION

SECTION 22 0548

VIBRATION AND SEISMIC CONTROL FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Quality of and requirements for anchorage and seismic restraint systems and vibration isolation systems for plumbing piping and equipment.

1.2 REFERENCES

- A. Association Publications:
 - 1. Federal Emergency Management Agency (FEMA) / Vibration Isolation and Seismic Control Manufacturers Association (VISCMA) / American Society of Civil Engineers (ASCE):
 - a. FEMA 412, 'Installing Seismic Restraints For Mechanical Equipment' (December 2002).
 - 2. Vibration Isolation and Seismic Control Manufacturers Association (VISCMA):
 - a. VISCMA 101-12, 'Seismic Restraint Specification Guidelines for Mechanical, Electrical, and Plumbing Systems'.
 - b. VISCMA 102-12, 'Vibration Isolation Specification Guidelines for Mechanical, Electrical, and Plumbing Systems'.
- B. Definitions:
 - 1. Vibration Isolation: Vibration reduction in which an isolation system is placed between the source of unwanted vibration and an item which needs to be shielded from the vibration.
- C. Reference Standards:
 - 1. American National Standards Institute / Sheet Metal And Air Conditioning Contractors' National Association:
 - a. ANSI/SMACNA 001-2008, 'Seismic Restraint Manual: Guidelines For Mechanical Systems' (3rd Edition).
 - 2. American Society of Civil Engineers / Structural Engineering Institute:
 - a. ASCE/SEI 7-10, 'Minimum Design Loads for Buildings and Other Structures'.
 - 1) Chapter 13, 'Seismic Design Requirements For Nonstructural Components'.
 - 3. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):
 - a. 2011 ASHRAE Handbook - HVAC Applications.
 - 1) Chapter 48, 'Noise and Vibration Control'.
 - 2) Chapter 55, 'Seismic- and Wind-Resistant Design'.
 - 4. ASTM International:
 - a. ASTM A615/A615M-12, 'Standard Specification for Deformed & Plain Billet-Steel Bars for Concrete Reinforcement'.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Restraint system and anchorage method to be used for each piece of equipment.
 - b. Seismic restraints and calculations for all flexible mounted equipment.
 - c. Vibration isolators and flexible couplings.
 - d. Clearly outlined procedures for installing and adjusting isolators, seismic bracing anchors, and snubbers.
 - 2. Shop Drawings:

- a. Show size, hanger length, and location of seismic restraints for piping and ductwork.
- b. Show details for each isolator and seismic brace with snubbers proposed for specified equipment.
- c. Show details for proposed structural steel frames and rails and for anchors to be used in conjunction with isolation of equipment.
- d. Show locations of piping and ductwork restraints on installation and fabrication floor plans (not bid set of documents of floor plans), noting size and type of restraint to be used.
- e. Show details of supports, hangers, anchorage, and bracing for isolated equipment as designed or proposed by professional engineer employed by Restraint Manufacturer and qualified with seismic experience in bracing for mechanical equipment. Shop drawings submitted for seismic bracing and anchors shall bear engineer's signed professional seal.
- f. Include anchor bolt calculations, signed and stamped by registered engineer, showing adequacy of bolt sizing and type.
 - 1) Calculations shall include anchor embedment, minimum edge distance and minimum center distance.
 - 2) Design lateral forces shall be distributed in proportion to mass distribution of equipment.
 - 3) Furnish calculations for anchors on restraint devices, cable, isolators, and on rigidly mounted equipment.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 1. System design and installation shall meet seismic requirements as defined in ASCE/SEI 7-10, 'Minimum Design Loads for Buildings and Other Structures' and applicable state and local codes in accordance with minimum restraint capability of 1.0 g.
 2. All products must be California certified/approved and labeled:

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Manufacturers:
 1. Type One Acceptable Manufacturers:
 - a. Amber / Booth Company, Houston, TX www.amberbooth.com.
 - b. Mason Industries Inc, Hauppauge, NY www.mason-ind.com.
 - c. Vibration Mountings and Control Inc, Bloomington, NJ (201) 838-1780.
 - d. Equal as approved by Architect before bidding. See Section 01 6200.
- B. Performance:
 1. Design Criteria:
 - a. Seismic Requirements: Mechanical equipment, piping, and ductwork shall be braced, snubbed, or supported to withstand seismic disturbances and remain operational.
 - b. Vibration Isolation Requirements: Isolate equipment from structure by means of resilient vibration and noise isolators.
- C. Materials:
 1. Isolation And Seismic Equipment:
 - a. Piping:
 - 1) Restrain piping in accordance with ANSI/SMACNA 001 Seismic Restraint Manual, Chapter 4, Figures 4.11 to 4.19.
 - b. Equipment with Fixed Anchor or Support:
 - 1) Restraint designed according to ASCE/SEI 7-10, Chapter 13, 'Seismic Design Requirements For Nonstructural Components'.
 - 2) Horizontal force factor for elements of structures:

- a) In addition, vertical force restraint requirement shall be computed at 1/2 value of horizontal forces.
 - b) Restrain equipment not anchored directly to floors by cable system designed and furnished by Restraint Manufacturer.
 - 2. Vibration Isolation Requirements:
 - a. Unless otherwise noted, isolate plumbing equipment one horsepower and over from structure by means of resilient vibration and noise isolators in accordance with ASHRAE 'Handbook - HVAC Applications', Chapter 48, Table 47, 'Selection Guide for Vibration Isolation'.
 - b. Design and install isolation equipment, hangers, connections, and other isolating devices to prevent transmission of vibration to structure from equipment and associated piping and ductwork.
 - c. For floor-mounted equipment, use recommendations of Chapter 48, Table 47, 'Selection Guide for Vibration Isolation'.
 - d. For roofs and floors constructed with open web joints, thin long span slabs, wooden construction and unusual light weight construction, evaluate equipment weighing more than **300 lbs** to determine additional deflection of structure caused by equipment weight. Isolator deflection shall be 15 times additional deflection or deflection shown in Chapter 48, Table 47, 'Selection Guide for Vibration Isolation', whichever is greater.
 - e. Under-Equipment Spring Isolators:
 - 1) Equal to Mason SSLFH earthquake motion restrained spring mounts with freestanding stable steel springs, leveling bolts, corrosion resistant finish, motion limiting design, uplift restraining bolts, and **1/4 inch** ribbed neoprene noise stop pad.
 - 2) Isolators shall accept force in any direction up to 1.0 g without failure, and shall limit movement to **3/4 inch** in any direction.
 - 3) Springs shall have 50 percent overload capacity.
 - 4) Size as required to achieve specified static deflection.
 - 5) Outer diameter of spring proper shall not be less than **0.08 inch** of spring height when in loaded position.
 - f. Overhead Support Spring And Rubber Hangers:
 - 1) Combination spring and neoprene hangers.
 - 2) Hanger bracket shall have 500 percent overload capability and shall allow up to 15 degree hanger rod misalignment without short-circuiting.
 - 3) Springs shall have 50 percent overload capacity.
 - 4) Provide seismic bracing as required.
 - g. Isolate piping and ductwork in mechanical equipment room and piping and ductwork three supports away or **50 feet** from other mechanical equipment, whichever is greater, from structure by means of vibration and noise isolators:
 - 1) Isolate suspended piping with combination spring and fiberglass hangers in supporting rods.
 - 2) Support floor-mounted piping directly on spring mounts.
 - h. Isolate vertical pipe risers from structure using vibration and noise isolating expansion hangers having minimum rated deflection of four times anticipated pipe movement. Enclose in housing for fail-safe equipment.
 - i. Incorporate flexible connectors in piping adjacent to reciprocating equipment.
 - j. Incorporate flexible connections in ductwork adjacent to air-moving units.
 - k. Elastomeric Isolator: Neoprene or high quality synthetic rubber with anti-ozone and anti-oxidant additives.
 - l. Nuts, Bolts, And Washers: Electroplated zinc.
 - m. Isolators Exposed To Weather: Cadmium plated and neoprene coated springs.
 - 3. Seismic restraint equipment and resilient isolation devices shall be designed and furnished by single Manufacturer.
- D. Finishes:
- 1. Clean and paint steel components:
 - a. Thoroughly clean structural steel bases of welding slag and prime with zinc-chromate or metal etching primer.
 - b. Etch and paint hot dipped galvanized steel components.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Isolation Equipment:

1. Mount vibration isolated equipment on rigid steel frames or concrete bases unless Equipment Manufacturer certifies direct attachment capability.
2. Install snubbers with factory set clearances.
3. Piping:
 - a. Protect isolated and non-isolated piping **2-1/2 inches** inside diameter and larger in all planes by restraints to accommodate thermal movement as well as restrain seismic motions.
 - b. Locations shall be as scheduled and include, but not be limited to:
 - 1) At drops to equipment and at flexible connections.
 - 2) At 45 degree or greater changes in direction of pipe.
 - 3) At horizontal runs of pipe **30 feet** maximum on center spacing.
 - 4) Gas piping shall have additional restraints as scheduled.
4. Ductwork:
 - a. Protect isolated and non-isolated rectangular ductwork **4 sq ft** in cross-sectional area and larger in all planes by restraints to accommodate thermal movement as well as restrain seismic motion.
 - b. Locations shall be determined by Seismic Restraint Manufacturer and include, but not be limited to:
 - 1) Horizontal runs of ductwork **30 feet** maximum on center spacing.
 - 2) 45 degree or greater changes in direction of ductwork.
 - 3) Each end of duct runs and drops of equipment.
 - 4) Each flexible connection.

B. Vibration Isolation:

1. Install piping and ductwork to prevent transmission of noise and vibration into structure.

END OF SECTION

SECTION 22 0553

IDENTIFICATION FOR PLUMBING PIPES AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install identification of plumbing piping and equipment as described in Contract Documents.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Materials:
 - 1. Labels:
 - a. Equipment Identification:
 - 1) Black formica, with white reveal when engraved.
 - 2) Lettering to be 3/16 inch high minimum.
 - 2. Paint:
 - a. One Coat Primer:
 - 1) 6-2 Quick Drying Latex Primer Sealer over fabric covers.
 - 2) 6-205 Metal Primer under dark color paint.
 - 3) 6-6 Metal Primer under light color paint.
 - b. Finish Coats: Two coats 53 Line Acrylic Enamel.
 - c. Performance Standard: Paints specified are from Pittsburgh Paint & Glass (PPG), Pittsburgh, PA www.pittsburghpaints.com or PPG Canada Inc, Mississauga, ON (800) 263-4350 or (905) 238-6441.
 - d. Type Two Acceptable Products. See Section 01 6200.
 - 1) Paint of equal quality from following Manufacturers may be submitted for Architect's approval before use. Maintain specified colors, shades, and contrasts.
 - a) Benjamin Moore, Montvale, NJ www.benjaminmoore.com or Toronto, ON (800) 304-0304 or (416) 766-1176.
 - b) ICI Dulux, Cleveland, OH or ICI Paints Canada Inc, Concord, ON www.dulux.com.
 - c) Sherwin Williams, Cleveland, OH www.sherwin-williams.com.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Labels:
 - 1. Identify following items with specified labels fastened to equipment with screws (unless noted otherwise):
 - a. Water Heaters.
 - 2. Engrave following data from Equipment Schedules on Drawings onto labels:
 - a. Equipment mark.
 - b. Room(s) served.
 - c. Panel and breaker from which unit is powered.

- B. Painting:
1. Only painted legends, directional arrows, and color bands are acceptable.
 2. Locate identifying legends, directional arrows, and color bands at following points on exposed piping of each piping system:
 - a. Adjacent to each item of equipment.
 - b. At point of entry and exit where piping goes through wall.
 - c. On each riser and junction.
 - d. Every **25 feet** on long continuous lines.
 - e. Stenciled symbols shall be one inch high and black.

3.2 ATTACHMENTS

- A. Schedules:
1. Pipe Identification Schedule:
 - a. Apply stenciled symbols as follows:

Pipe Use	Abbreviation
Domestic Cold Water	CW
Domestic Hot Water	HW

END OF SECTION

SECTION 22 0719

PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install insulation on hot and cold water lines, fittings, valves, and accessories as described in Contract Documents.
 - 2. Furnish and install insulation on roof drain piping as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 22 1116: 'Domestic Water Piping'.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Armacell, Mebane, NC www.armacell.com.
 - b. Childers Products Co, Eastlake, OH www.fosterproducts.com.
 - c. IMCOA, Youngsville, NC www.nomacokflex.com.
 - d. Johns-Manville, Denver, CO www.jm.com.
 - e. Knauf, Shelbyville, IN www.knauffiberglass.com.
 - f. Manson, Brossard, PQ, Canada www.isolationmanson.com.
 - g. Nomaco Inc, Yopungsville, NC www.nomacokflex.com.
 - h. Owens-Corning, Toledo, OH www.owenscorning.com.
 - i. Speedline Corp, Solon, OH www.speedlinepvc.com.
- B. Materials:
 - 1. Above Grade Metal Piping:
 - a. Insulation For Piping:
 - 1) Snap-on glass fiber or melamine foam pipe insulation, or heavy density pipe insulation with factory vapor jacket.
 - 2) Insulation Thickness:

Service Water Temperature	Pipe Sizes		
	Up to 1-1/4 In	1-1/2 to 2 In	Over 2 In
170 - 180 Deg F	One In	1-1/2 In	2 In
140 - 160 Deg F	1/2 In	One In	1-1/2 In
45 - 130 Deg F	1/2 In	1/2 In	One In
 - 3) Performance Standards: Fiberglas ASJ by Owens-Corning.
 - 4) Type One Acceptable Manufacturers:
 - a) Childers Products.
 - b) Knauf.
 - c) Manson.
 - d) Owens-Corning.
 - e) Johns-Manville.
 - f) Equal as approved by Architect before bidding. See Section 01 6200.

- b. Fitting, Valve, And Accessory Covers:
 - 1) PVC.
 - 2) Performance Standard: Zeston by Johns-Manville.
 - 3) Type One Acceptable Manufacturers:
 - a) Knauf.
 - b) Speedline.
 - c) Johns-Manville.
 - d) Equal as approved by Architect before bidding. See Section 01 6200.
- 2. Below Grade Metal Piping:
 - a. Insulation:
 - 1) **1/2 inch** thick.
 - 2) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
 - a) SS Tubolit by Armacell.
 - b) ImcoLock by Imcoa.
 - c) Nomalock or Therma-Cel by Nomaco.
 - b. Joint Sealant:
 - 1) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
 - a) Armacell 520.
 - b) Nomaco K-Flex R-373.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Above Grade Piping:
 - 1. Apply insulation to clean, dry piping with joints tightly butted.
 - 2. Install insulation in manner to facilitate removal for repairs. Place sections or blocks so least possible damage to insulation will result from inspection or repairs of piping or equipment.
 - 3. Piping up to **1-1/4 inch** Diameter:
 - a. Adhere 'factory applied vapor barrier jacket lap' smoothly and securely at longitudinal laps with white vapor barrier adhesive.
 - b. Adhere **3 inch** wide self-sealing butt joint strips over end joints.
 - 4. Piping **1-1/2 inches** Diameter And Larger:
 - a. Use broken-joint construction in application of two-layer covering.
 - b. Fill cracks and depressions with insulating cement mixed to thick plastic paste.
 - 1) Apply by hand in several layers to make up total specified thickness.
 - 2) Final layer shall have smooth uniform finish before application of covering.
 - 5. Fittings, Valves, And Accessories:
 - a. Do not apply insulation over flanged joints or victaulic couplings until piping has been brought up to operating temperature and flange bolts have been fully tightened. Insulate valves so wheel, stem, and packing nut are exposed.
 - b. Insulate with same type and thickness of insulation as pipe, with ends of insulation tucked snugly into throat of fitting and edges adjacent to pipe insulation tufted and tucked in.
 - c. Piping Up To **1-1/4 Inch** Diameter:
 - 1) Cover insulation with one piece fitting cover secured by stapling or taping ends to adjacent pipe covering.
 - 2) Alternate Method:
 - a) Insulate fittings, valves, and accessories with one inch of insulating cement and vapor seal with two **1/8 inch** wet coats of vapor barrier mastic reinforced with glass fabric extending **2 inches** onto adjacent insulation.
 - d. Piping **1-1/2 inches** To **2 Inches**:
 - 1) Insulate with hydraulic setting insulating cement or equal, to thickness equal to adjoining pipe insulation.
 - 2) Apply final coat of fitting mastic over insulating cement.
 - e. Piping **2-1/2 inch** And Larger:

- 1) Insulate with segments of molded insulation securely wired in place and coated with skim coat of insulating cement.
 - 2) Apply fitting mastic, fitting tape and finish with final coat of fitting mastic.
 6. Pipe Hangers:
 - a. Do not allow pipes to come in contact with hangers.
 - b. Provide 16 ga by 6 inch long galvanized shields at each pipe hanger to protect pipe insulation from crushing by clevis hanger.
 - c. Provide 22 ga by 6 inch long galvanized shield at each pipe hanger to protect insulation from crushing by Unistrut type hanger.
 7. Protect insulation wherever leak from valve stem or other source might drip on insulated surface, with aluminum cover or shield rolled up at edges and sufficiently large in area and of shape that dripping will not splash on surrounding insulation.
- B. Below Grade Piping:
1. Slip underground pipe insulation onto pipe and seal butt joints.
 2. Where slip-on technique is not possible, slit insulation, apply to pipe, and seal seams and joints.

END OF SECTION

SECTION 22 1116

DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Perform excavating and backfilling required by work of this Section.
 - 2. Furnish and install potable water piping complete with necessary valves, connections, and accessories inside building and connect with outside utility lines **5 feet** from building perimeter as described in Contract Documents.

1.2 REFERENCES

- A. Reference Standards:
 - 1. American National Standards Institute / American Society of Sanitary Engineers:
 - a. ANSI/ASSE 1017-2009, 'Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems'.
 - b. ANSI/ASSE 1070-2004, 'Performance Requirements for Water Temperature Limiting Devices'.
 - 2. ASTM International:
 - a. ASTM B88-09, 'Standard Specification for Seamless Copper Water Tube'.

1.3 SUBMITTALS

- A. Informational Submittals:
 - 1. Test And Evaluation Reports:
 - a. Written report of sterilization test.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Materials:
 - a. Underground piping:
 - 1) Underground water piping shall be Type K soft copper with no joints.
 - b. Aboveground concealed piping:
 - 1) Type L hard drawn copper tubing, ASTM B88, with brazed or solder joints and wrought copper fittings.
- 2. Fittings:
 - a. Ball Valves:
 - 1) Use ball valves exclusively unless otherwise specified. Ball valves shall be by single manufacturer from approved list below.
 - 2) Valves shall be two-piece, full port for **150 psi** SWP.
 - a) Operate with flow in either direction, suitable for throttling and tight shut-off.
 - b) Body: Bronze, **150 psig** wsp at **350 deg F** and **400 psig** wog.
 - c) Seat: Bubble tight at **100 psig** under water.
 - 3) Class One Quality Standard: Nibco T585 or S585.

- a) Equal by Conbraco 'Apollo,' Hammond, Milwaukee, or Watts.
- b. Combination Pressure Reducing Valve / Strainer:
 - 1) Integral stainless steel strainer, or separate 'Y' strainer installed upstream of pressure reducing valve.
 - 2) Built-in thermal expansion bypass check valve.
 - 3) Class One Quality Standard: Watts U5B:
 - a) Equal by Cash Acme, Cla-Val Hi Capacity, Conbraco 36C, Honeywell-Braukmann, Spence Hi Capacity, Watts, or Wilkins. See Section 01 6200..

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Below Grade:
 - 1. Install piping under slabs without joints where possible.
 - 2. Insulate water piping buried within building perimeter.
 - 3. Bury water piping **6 inches** minimum below bottom of slab and encase in **2 inches** minimum of sand.
- B. Locate cold water lines a minimum of **6 inches** from hot water line.

3.2 FIELD QUALITY CONTROL

- A. Field Tests:
 - 1. Before pipes are covered, test systems in presence of Architect at **125 psig** hydrostatic pressure for 4 hours and show no leaks.
 - 2. Disconnect equipment not suitable for **125 psig** pressure from piping system during test period.

3.3 CLEANING

- A. Sterilize potable water system with solution containing 200 parts per million minimum of available chlorine and maintaining pH of 7.5 minimum. Introduce chlorinating materials into system in manner approved by Architect. Allow sterilization solution to remain for twenty four (24) hours and open and close valves and faucets several times during that time.
- B. After sterilization, flush solution from system with clean water until residual chlorine content is less than 0.2 parts per million.
- C. Water system will not be accepted until negative bacteriological test is made on water taken from system. Repeat dosing as necessary until such negative test is accomplished.

END OF SECTION

SECTION 22 1119

DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install miscellaneous potable water piping specialties as described in Contract Documents.

PART 2 - PRODUCTS

2.1 ACCESSORIES

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Ashcroft, Stratford, CT www.ashcroftinc.com.
 - b. Chicago Faucet Co, Des Plaines, IL www.chicagofaucets.com.
 - c. ConBraco Industries, Matthews, NC www.conbraco.com.
 - d. Febco, Denver, CO www.repmasters.com.
 - e. H O Trerice, Oak Park, MI www.hotco.com.
 - f. IPS Corporation, Compton, CA www.ipscorp.com.
 - g. Josam Co, Michigan City, IN www.josam.com.
 - h. Jay R. Smith Manufacturing Co, Montgomery, AL www.jrsmith.com.
 - i. Mifab Manufacturing Inc, Chicago, IL www.mifab.com.
 - j. Nibco Inc, Elkhart, IN www.nibco.com.
 - k. Oatey, Cleveland, OH www.oatey.com.
 - l. Precision Plumbing Products, Portland, OR www.pppinc.net.
 - m. Prier Products, Inc., Grandview, MD www.prier.com.
 - n. Proset Systems Inc., Lawrenceville, GA www.prosetsystems.com.
 - o. Sioux Chief Manufacturing Co, Peculiar, MO www.siuoxchief.com.
 - p. Sure Seal, Tacoma, WA www.thesureseal.com.
 - q. Wade Div Tyler Pipe, Tyler, TX www.wadedrains.com.
 - r. Watts Drainage, Spindale, NC www.watts.com or Watts Industries, Burlington, ON, Canada www.wattscda.com.
 - s. Weiss Instruments, Inc., Holtsville, NY www.weissinstruments.com.
 - t. Woodford Manufacturing, Colorado Springs, CO www.woodfordmfg.com.
 - u. Zurn Cast Metals, Erie, PA or Zurn Industries Limited, Mississauga, ON www.zurn.com.
- B. Materials:
 - 1. Trap Guard Trap Seal:
 - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) Trap Guard by Proset:
 - a) Install per Manufacturer's recommendations.
 - 2) Sure Seal by Sure Seal:
 - a) Install per Manufacturer's recommendation.
 - b. Brass Gauge Cocks:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) 1092 by Ashcroft.
 - b) 865 by H O Trerice.

2. Exterior Hydrants:
 - a. Provide with integral anti-siphon device. Key-operated.
 - b. Non-freeze.
3. Shock Arrestors:
 - a. Provide shock arrestors at all quick close fittings including but not limited to flush valves, washing machine connections and drinking fountains.
 - b. Install with accessible isolation valve
 - c. Shock arrestors shall be premanufactured units tested and rated in accordance with PDI-WH-201 and ASSE-1010 sized per use.
 - d. Acceptable manufacturers: Zurn, Wade, Smith, Josam

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Gauges: Connect to pipe with **1/4 inch** connections utilizing gauge cocks.

END OF SECTION

SECTION 22 1313

FACILITY SANITARY SEWERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install soil, waste, and vent piping systems within building and connect with outside utility lines **5 feet** out from building where applicable.
 - 2. Perform excavation and backfill required by work of this Section.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference: Participate in pre-installation conference specified in Section 03 3111.

1.3 REFERENCES

- A. Reference Standards:
 - a. ASTM D2321-11, 'Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications'.
 - b. ASTM D2564-12, 'Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems'.
 - c. ASTM D3034-08, 'Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings'.
 - d. ASTM F656-10, 'Standard Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings'.
 - e. ASTM F891-10, 'Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Plastic Pipe With a Cellular Core'.
- 2. International Code Council:
 - a. ICC IPC-2012, 'International Plumbing Code'.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Performance:
 - 1. Design Criteria:
 - a. Minimum size of waste piping installed under floor slab on grade shall be **2 inches**.
- B. Materials:
 - 1. Piping And Fittings: PVC Schedule 40 cellular core plastic pipe and pipe fittings meeting requirements of ASTM F891, joined using cement primer meeting requirements of ASTM F656 and pipe cement meeting requirements of ASTM D2564.
 - a. Furnish wall cleanouts with chrome wall cover and screw.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Excavate and backfill as specified in Sections 31 2316 and 31 2323 with following additional requirements:
1. Runs shall be as close as possible to those shown on Drawings.
 2. Excavate to required depth and grade to obtain fall required. Grade soil and waste lines within building perimeter **1/4 inch** fall in **one foot** in direction of flow.
 3. Bottom of trenches shall be hard. Tamp as required.
 4. Remove debris from trench before laying of pipe.
 5. Do not cut trenches near footings without consulting Architect.
- B. Thermoplastic Pipe And Fittings:
1. General: Piping and joints shall be clean and installed according to Manufacturer's recommendations. Break down contaminated joints, clean seats and gaskets and reinstall.
 2. Above Grade: Locate pipe hangers every **4 feet** on center maximum and at elbows.
 3. Below Grade:
 - a. Install in accordance with Manufacturer's recommendations and ASTM D2321.
 - b. Stabilize unstable trench bottoms.
 - c. Bed pipe true to line and grade with continuous support from firm base.
 - 1) Bedding depth: **4 to 6 inches**.
 - 2) Material and compaction to meet ASTM standard noted above.
 - d. Excavate bell holes into bedding material so pipe is uniformly supported along its entire length. Blocking to grade pipe is forbidden.
 - e. Trench width at top of pipe:
 - 1) Minimum: **18 inches** or diameter of pipe plus **12 inches**, whichever is greater.
 - 2) Maximum: Outside diameter of pipe plus **24 inches**.
 - f. Do not use backhoe or power equipment to assemble pipe.
 - g. Initial backfill shall be **12 inches** above top of pipe with material specified in referenced ASTM standard.
 - h. Minimum cover over top of pipe not under building slab:
 - 1) **36 inches** before wheel loading.
 - 2) **48 inches** before compaction.
- C. Install piping so cleanouts may be installed as follows:
1. Where shown on Drawings and near bottom of each stack and riser.
 2. At every 135 degrees of accumulative change in direction for horizontal lines.
 3. Every **100 feet** of horizontal run.
 4. Extend piping to accessible surface. Do not install piping so cleanouts must be installed in carpeted floors. In such locations, configure piping so wall type cleanouts may be used.
- D. Each fixture and appliance discharging water into sanitary sewer or building sewer lines shall have seal trap in connection with complete venting system so gasses pass freely to atmosphere with no pressure or siphon condition on water seal.
- E. Vent entire waste system to atmosphere. Join lines together in fewest practicable numbers before projecting above roof. Set back vent lines so they will not pierce roof near edge or valley. Vent line terminations shall be:
1. **6 inches** minimum above roof and **12 inches** minimum from any vertical surface.
 2. Same size as vent pipe.
 3. In areas where minimum design temperature is below **0 deg F** or where frost or snow closure may be possible:
 - a. Vent line terminations shall be same size as vent pipe, except no smaller than **2 inches** in diameter.
 - b. Vents shall terminate **10 inches** minimum above roof or higher if required by local codes.

- F. Furnish and install firestopping at penetrations of fire-rated structures as required under Sections 07 8400 and 22 0501.
- G. If test Tees are used for testing, plug Tees so wall finish can be installed. Do not leave as exposed cleanouts.

3.2 FIELD QUALITY CONTROL

- A. Field Tests:
 - 1. Conduct tests for leaks and defective work. Notify Architect before testing.
 - 2. Thermoplastic Pipe System:
 - a. Before backfilling and compacting of trenches, Fill waste and vent system with water to roof level or **10 feet** minimum, and show no leaks for two hours. Correct leaks and defective work.
 - b. After backfilling and compacting of trenches is complete but before placing floor slab, re-test as specified above. Uncover pipe and correct leaks and defective work. Re-backfill and compact and re-test.

END OF SECTION

SECTION 22 1319

FACILITY SANITARY SEWER SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Products Furnished But Not Installed Under this Section as described in Contract Documents.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Manufacturers:
1. Manufacturer Contact List:
 - a. H-M Company, Cincinnati, OH www.draintroughs.com.
 - b. Josam Co, Michigan City, IN www.josam.com.
 - c. Jay R. Smith Manufacturing Co, Montgomery, AL www.jrsmith.com.
 - d. Mifab Manufacturing Inc, Chicago, IL www.mifab.com.
 - e. Proset Systems, Lawrenceville, GA www.prosetsystems.com.
 - f. Scherping Systems, Winstead, MN www.scherpingsystems.com.
 - g. Sioux Chief Manufacturing Co, Peculiar, MO www.siuoxchief.com.
 - h. Sureseal Manufacturing, Tacoma WA www.thesureseal.com.
 - 1) Contact Information:
 - a) All Areas except Idaho and Utah: Rick Ensley (253) 564-0624, rick@thesureseal.com.
 - b) Idaho and Utah Areas: Mark Evans, phone (801) 748-1222, mark@franklinjames.com.
 - i. Wade Div Tyler Pipe, Tyler, TX www.wadedrains.com.
 - j. Watts Drainage, Spindale, NC www.watts.com or Watts Industries, Burlington, ON, Canada www.wattscda.com.
 - k. Zurn Cast Metals, Erie, PA or Zurn Industries Limited, Mississauga, ON www.zurn.com.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 22 3423

GAS DOMESTIC WATER HEATERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install gas-fired instantaneous water heater as described in Contract Documents.

1.2 REFERENCES

- A. Reference Standards:
 - 1. CSA Group / American National Standards Institute:
 - a. CSA ANSI Z21.22-99(R08)/CSA 4.4-M99(R08), 'Relief Valves for Hot Water Supply Systems'.

1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Seismic Anchoring System:
 - a. Required for Seismic Design Category (SDC) C, D, E, or F or where authority having jurisdiction (AHJ) requires seismic protection use for water heater seismic anchoring systems.
 - b. Seismic Design Category (SDC) shall be determined by Project Structural Engineer.
 - 2. All products must be California certified/approved and labeled:
 - a. Straps/anchoring systems.
 - b. Fasteners.

1.4 WARRANTY

- A. Manufacturer Warranty:

PART 2 - PRODUCTS

2.1 EQUIPMENT

- A. Materials:
 - 1. Condensing Type Water Heaters:
 - a. Stainless steel or 90/10 cupronickel heat exchanger, pressure tested and rated for 150 psi w.p. complete with thermostat, high limit control, gas pressure regulator, 100 percent safety shutoff and powered combustion air blower. AGA and CGA approved.
 - b. 94 percent thermal efficiency.

- c. Temperature and pressure relief valve sized to match heat input and set to relieve at 120 psi.
- d. Vacuum relief valve meeting requirements of CSA ANSI Z21.22.

2.2 ACCESSORIES

- A. Anchoring Components:
 - 1. One inch by 18 ga galvanized steel straps.
 - 2. No. 10 by 2-1/2 inch screws.
- B. Thermal Expansion Absorbers:
 - 1. Bladder type for use with potable water systems.
 - 2. Type One Acceptable Products:
 - a. Therm-X-Trol ST-12 by Amtrol Inc, West Warwick, RI www.amtrol.com.
 - b. Equal as approved by Architect before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install temperature-pressure relief valve on hot water heater and pipe discharge to directly above funnel of floor drain.
- B. Anchor water heaters to wall using two anchoring straps and specified screws.
 - 1. Anchors shall be installed with one on vertical upper 1/3 and one on lower 1/3 of water heater.
- C. Seismic Anchoring Systems shall be installed following Manufacturers requirements to California certifications or for minimum requirement, use Lag Bolts into studs.

3.2 ADJUSTING

- A. Set discharge water temperature at 120 deg F or as indicated on Contract Drawings.

END OF SECTION

SECTION 22 4213

COMMERCIAL WATER CLOSETS AND URINALS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install plumbing fixtures as described in Contract Documents.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. American Standard Brands, Piscataway, NJ www.americanstandard-us.com or American Standard Canada, Mississauga, ON www.americanstandard.ca.
 - b. AMTC - Advanced Modern Technologies Corp, Woodland Hills, CA www.amtccorporation.com.
 - c. Bemis Manufacturing Co, Sheboygan Falls, WI www.bemismfg.com.
 - d. Beneke by Sanderson Plumbing Products, Columbus, MS www.sppi.com.
 - e. BrassCraft Manufacturing Co, Novi, MI or BrassCraft Canada Ltd, St Thomas, ON www.brasscraft.com.
 - f. Chicago Faucet Co, Des Plaines, IL www.chicagofaucets.com.
 - g. Church Seat Co, Sheboygan Falls WI www.churchseats.com.
 - h. Delany Flush Valves, Charlottesville, VA www.delanyproduct.com.
 - i. Delta Faucet Co, Indianapolis, IN www.deltafaucet.com or Delta Faucet Canada, London, ON (519) 659-3626.
 - j. Crane Plumbing, Evanston, IL www.cranepumbing.com or Crane Canada Ltd, Plumbing Div, Montreal, PQ www.cranepumbing.ca.
 - k. Dearborn Brass, Cleveland, OH www.dearbornbrass.com.
 - l. Gerber Plumbing Fixtures LLC, Woodridge, IL www.gerberonline.com.
 - m. Josam Co, Michigan City, IN www.josam.com.
 - n. Jay R. Smith Mfg. Co, Montgomery, AL www.jrsmith.com.
 - o. Kohler Co Plumbing Div, Kohler, WI www.us.kohler.com.
 - p. McGuire Manufacturing Co, Cheshire, CT www.mcguiremfg.com.
 - q. Mifab Manufacturing Inc, Amherst, NY www.mifab.com.
 - r. Moen Incorporated, North Olmsted, OH, or Moen Canada, Oakville, ON www.moen.com.
 - s. Olsonite Corp, Newnan, GA www.olsonite.net or Olsonite Co Ltd, Tilbury, ON (519) 682-1240.
 - t. Sloan Valve Co, Franklin Park, IL www.sloanvalve.com.
 - u. South Fork Manufacturing, Coalville, UT (801) 953-3001 www.dirt-grabber.com.
 - v. Toto U.S.A., Inc., Morrow, GA www.totousa.com.
 - w. Wade Div Tyler Pipe, Tyler, TX www.wadedrains.com.
 - x. Zurn Commercial Brass, Sanford, NC www.zurn.com or Zurn Industries Ltd, Mississauga, ON (905) 795-8844.
 - y. Zurn Cast Metal, Erie, PA www.zurn.com.
- B. Performance:
 - 1. Design Criteria:

- a. Interior exposed pipe, valves, and fixture trim, including trim behind custom casework doors, shall be chrome plated.
- b. All materials must be low lead compliant.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install each fixture with separate vent line. Do not circuit vent.
- B. Ensure provisions are made for proper support of fixtures and that rough-in piping is accurately set and protected from movement and damage.
 - 1. Seal wall-mounted fixtures around edges to wall with sealant specified in Section 07 9213.
 - 2. Attach wall-hung fixtures to carriers.
 - 3. Support fixture hanger or arm free of finished wall.
- C. Adjust flush valves for proper flow.
- D. Unless otherwise noted, provide each individual fixture supply with chrome-plated stop valve with hand wheel.
- E. Install fixtures with accessible stop or control valve in each branch supply line.
- F. Make fixture floor connections with approved brand of cast iron floor flange, soldered or caulked securely to waste pipe. Make joints between fixtures and floor flanges tight with approved fixture setting compound or gaskets. Caulk between fixtures and floor with sealant specified in Section 07 9213. Point edges.

3.2 CLEANING

- A. Polish chrome finish at completion of Project.

END OF SECTION

SECTION 22 4216

COMMERCIAL LAVATORIES AND SINKS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install plumbing fixtures as described in Contract Documents.
 - 2.

1.2 SUBMITTALS

- A. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Final, executed copy of Warranty.

1.3 WARRANTY

- A. Manufacturer Warranty:
 - 1. Manufacturer's standard Warranty against material or Manufacturing defects.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. American Standard Brands, Piscataway, NJ www.americanstandard-us.com or American Standard Canada, Mississauga, ON www.americanstandard.ca.
 - b. BrassCraft Manufacturing Co, Novi, MI or BrassCraft Canada Ltd, St Thomas, ON www.brasscraft.com.
 - c. Brocar Products Inc, Cincinnati, OH www.brocar.com.
 - d. CECO, Huntington Park, CA www.cecosinks.com.
 - e. Chicago Faucet Co, Des Plaines, IL www.chicagofaucets.com.
 - f. Dearborn Brass, Tyler, TX www.dearbornbrass.com.
 - g. Delta Faucet Co, Indianapolis, IN www.deltafaucet.com or Delta Faucet Canada, London, ON (519) 659-3626.
 - h. EBC / Just Manufacturing Co, Franklin Park, IL www.justmfg.com.
 - i. Elkay Manufacturing Co, Oak Brook, IL www.elkay.com.
 - j. Fiat Products, Evanston, IL www.cranepumbing.com or Fiat Products Ltd, Winnipeg, MB www.fiat.ca.
 - k. Gerber Plumbing Fixtures LLC, Woodridge, IL www.gerberonline.com.
 - l. Josam Co, Michigan City, IN www.josam.com.
 - m. Jay R. Smith Manufacturing Co, Montgomery, AL www.jrsmith.com.
 - n. Just Manufacturing Co, Franklin Park, IL www.justsinks.com.
 - o. Keeney Manufacturing Co, Newington, CT www.keeneymfg.com.
 - p. Kindred USA, Midland, ON www.kindred-sinkware.com.
 - q. Kohler Co Plumbing Div, Kohler, WI www.us.kohler.com.
 - r. McGuire Manufacturing Co, Cheshire, CT www.mcguiremfg.com.

- s. Mifab Manufacturing Inc, Amherst, NY www.mifab.com.
 - t. Moen Incorporated, North Olmsted, OH, or Moen Canada, Oakville, ON www.moen.com.
 - u. Omni Flow Controls, Harbor City, CA www.chronomite.com or www.omniflowcontrols.com.
 - v. Sloan Valve Co, Franklin Park, IL www.sloanvalve.com.
 - w. Speakman Company, New Castle, DE www.speakmancompany.com.
 - x. Stern-Williams, Shawnee Mission, KS www.sternwilliams.com.
 - y. Symmons, Braintree, MA www.symmons.com.
 - z. T & S Brass & Bronze Works Inc, Travelers Rest, SC www.tsbrass.com.
 - aa. TrueBro Inc, Collierville, TN www.truebro.com.
 - bb. Wade Div Tyler Pipe, Tyler, TX www.wadedrains.com.
 - cc. Watts Drainage, Spindale, NC www.wattsdrainage.com or Watts Industries, Burlington, ON, Canada www.wattscda.com.
 - dd. Zurn Commercial Brass, Sanford, NC www.zurn.com or Zurn Industries Ltd, Mississauga, ON (905) 795-8844.
 - ee. Zurn Cast Metal, Erie, PA www.zurn.com.
- B. Performance:
- 1. Design Criteria:
 - a. Interior exposed pipe, valves, and fixture trim, including trim behind custom casework doors, shall be chrome plated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Ensure provisions are made for proper support of fixtures and that rough-in piping is accurately set and protected from movement and damage.
- B. Seal wall-mounted fixtures around edges to wall and counter top fixtures to countertop with sealant specified in Section 07 9213.
- C. Unless otherwise noted, provide each individual fixture supply with chrome-plated stop valve with hand wheel.
- D. Install fixtures with accessible stop or control valve in each hot and cold water branch supply line.
- E. Self-Supporting Lavatories: Install using carriers. Support carrier free of finished wall.
- F. Install Safety Covers on all under sink / lavatories with exposed water supply pipes and traps.
- G. Install Handicap Accessible Lavatories as per ADA height mounting requirements.

3.2 CLEANING

- A. Polish chrome finish at completion of Project.

END OF SECTION

SECTION 23 0501

COMMON HVAC REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Common requirements and procedures for HVAC systems.
 - 2. Responsibility for proper operation of electrically powered equipment furnished under this Division.
 - 3. Interface with Testing And Balancing Agency.
 - 4. Furnish and install sealants relating to installation of systems installed under this Division.
 - 5. Furnish and install Firestop Penetration Systems for HVAC system penetrations as described in Contract Documents.
 - 6. Furnish and install sound, vibration, and seismic control elements.
- B. Products Furnished But Not Installed Under This Section:
 - 1. Sleeves, inserts, and equipment for mechanical systems installed under other Sections.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's catalog data for each manufactured item.
 - 1) Provide section in submittal for each type of item of equipment. Include Manufacturer's catalog data of each manufactured item and enough information to show compliance with Contract Document requirements. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
 - 2) Include name, address, and phone number of each supplier.
 - 2. Shop Drawings:
 - a. Schematic control diagrams for each separate fan system, heating system, control panel, etc. Each diagram shall show locations of all control and operational components and devices. Mark correct operating settings for each control device on these diagrams.
 - b. Diagram for electrical control system showing wiring of related electrical control items such as firestats, fuses, interlocks, electrical switches, and relays. Include drawings showing electrical power requirements and connection locations.
 - c. Drawing of each temperature control panel identifying components in panels and their function.
 - d. Other shop drawings required by Division 23 trade Sections.
- B. Informational Submittals:
 - 1. Qualification Statement:
 - a. HVAC Firm:
 - 1) Provide Qualification documentation for manufacturer selected.
- C. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Operations and Maintenance Data (Modify and add to requirements of Section 01 7800):
 - 1) At beginning of HVAC section of Operations And Maintenance Manual, provide master index showing items included.

- a) Provide name, address, and phone number of Architect, Architect's Mechanical Engineer, General Contractor, and HVAC, Sheet Metal, Refrigeration, and Temperature Control subcontractors.
- b) Identify maintenance instructions by using same equipment identification used in Contract Drawings. Maintenance instructions shall include:
 - (1) List of HVAC equipment used indicating name, model, serial number, and nameplate data of each item together with number and name associated with each system item.
 - (2) Manufacturer's maintenance instructions for each piece of HVAC equipment installed in Project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance and lubrication instructions.
 - (3) Summary list of mechanical equipment requiring lubrication showing name of equipment, location, and type and frequency of lubrication.
- c) Provide operating instructions to include:
 - (1) General description of each HVAC system.
 - (2) Step by step procedure to follow in putting each piece of HVAC equipment into operation.
 - (3) Provide diagrams for electrical control system showing wiring of items such as smoke detectors, fuses, interlocks, electrical switches, and relays.
- b. Warranty Documentation:
 - 1) Include copies of warranties required in individual Sections of Division 23.
- c. Record Documentation:
 - 1) Manufacturers documentation:
 - a) Copies of approved shop drawings.

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:

- 1. In case of differences between building codes, laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Notify Architect in writing of such differences before performing work affected by such differences.
- 2. Identification:
 - a. Motor and equipment name plates as well as applicable UL / ULC and AGA / CGA labels shall be in place when Project is turned over to Owner.

B. Qualifications:

- 1. Company:
 - a. Company specializing in performing work of this section.
 - 1) Minimum five (5) years experience in HVAC installations.
 - 2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
 - b. Upon request, submit documentation.
- 2. Installer:
 - a. Licensed for area of Project.
 - b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
 - c. Upon request, submit documentation.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:

- 1. Accept valves on site in shipping containers with labeling in place.

B. Storage And Handling Requirements:

1. In addition to requirements specified in Division 01:
 - a. Stored material shall be readily accessible for inspection by Architect until installed.
 - b. Store items subject to moisture damage, such as controls, in dry, heated spaces.
 - 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.
2. Protect bearings during installation. Thoroughly grease steel shafts to prevent corrosion.

1.5 WARRANTY

- A. Manufacturer Warranty:
 1. Provide certificates of warranty for each piece of equipment made out in favor of Owner. Clearly record 'start-up' date of each piece of equipment on certificate.
- B. Special Warranty:
 1. Guarantee HVAC systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.
 2. If HVAC sub-contractor with offices located more than **150 miles** from Project site is used, provide service / warranty work agreement for warranty period with local HVAC sub-contractor approved by Architect. Include copy of service / warranty agreement in warranty section of Operation And Maintenance Manual.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Components shall bear Manufacturer's name and trade name. Equipment and materials of same general type shall be of same make throughout work to provide uniform appearance, operation, and maintenance.
- B. Pipe And Pipe Fittings:
 1. Use domestic made pipe and pipe fittings on Project.
- C. Sleeves:
 1. In Framing: Standard weight galvanized iron pipe, Schedule 40 PVC, or **14 ga** galvanized sheet metal two sizes larger than bare pipe or insulation on insulated pipe.
 2. In Concrete And Masonry: Sleeves through outside walls, interior shear walls, and footings shall be schedule 80 black steel pipe with welded plate.
- D. Valves:
 1. Valves of same type shall be of same manufacturer.

PART 3 - EXECUTION

3.1 INSTALLERS

- A. Acceptable Installers:
 1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

A. Drawings:

1. HVAC Drawings show general arrangement of piping, ductwork, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over HVAC Drawings.
3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.

B. Verification Of Conditions:

1. Examine premises to understand conditions that may affect performance of work of this Division before submitting proposals for this work. Examine adjoining work on which mechanical work is dependent for efficiency and report work that requires correction.
2. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.
3. Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.
4. Check that slots and openings provided under other Divisions through floors, walls, ceilings, and roofs are properly located. Perform cutting and patching caused by neglecting to coordinate with Divisions providing slots and openings at no additional cost to Owner.

3.3 PREPARATION

A. Changes Due To Equipment Selection:

1. Alternate manufacturer are acceptable. Where alternates are listed only those manufacturer's listed are acceptable unless approved before bidding. Any changes due to alternate manufacturers, even those where listed, are the responsibility of the contractor.
2. Where equipment specified or otherwise approved requires different arrangement or connections from that shown in Contract Documents, submit drawings, if requested by Architect, showing proposed installations.
3. If proposed changes are approved, install equipment to operate properly and in harmony with intent of Contract Documents. Make incidental changes in piping, ductwork, supports, installation, wiring, heaters, panelboards, and as otherwise necessary.
4. Provide any additional motors, valves, controllers, fittings, and other additional equipment required for proper operation of system resulting from selection of equipment.
5. Be responsible for the proper location of roughing-in and connections provided under other Divisions.

3.4 INSTALLATION

A. Interface With Other Work:

1. Furnish sleeves, inserts, supports, and equipment that are to be installed by others in sufficient time to be incorporated into construction as work proceeds. Locate these items and see they are properly installed.
2. Electrical: Furnish exact location of electrical connections and complete information on motor controls to installer of electrical system.
3. Testing And Balancing:

- a. Put HVAC systems into full operation and continue their operation during each working day of testing and balancing.
 - b. Make changes in pulleys, belts, fan speeds, and dampers or add dampers as required for correct balance as recommended by Testing And Balancing Agency and at no additional cost to Owner.
- B. Locating Equipment:
 1. Arrange pipes, ducts, and equipment to permit ready access to valves, cocks, unions, traps, filters, starters, motors, control components, and to clear openings of doors and access panels.
 2. Adjust locations of pipes, ducts, switches, panels, and equipment to accommodate work to interferences anticipated and encountered.
 3. Install HVAC work to permit removal of equipment and parts of equipment requiring periodic replacement or maintenance without damage to or interference with other parts of equipment or structure.
 4. Determine exact route and location of each pipe and duct before fabrication.
 - a. Right-Of-Way:
 - 1) Lines that pitch shall have right-of-way over those that do not pitch. For example, drains shall normally have right-of-way.
 - 2) Lines whose elevations cannot be changed shall have right-of-way over lines whose elevations can be changed.
 - b. Offsets, Transitions, and Changes in Direction:
 - 1) Make offsets, transitions, and changes in direction in pipes and ducts as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
 - 2) Furnish and install all traps, air vents, sanitary vents, and devices as required to effect these offsets, transitions, and changes in direction.
- C. Piping:
 1. Furnish and install complete system of piping, valved as indicated or as necessary to completely control entire apparatus.
 - a. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at site. This does not relieve this Division from responsibility for proper erection of systems of piping in every respect.
 - b. Arrange piping to not interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings.
 - 1) Provide accessible flanges or ground joint unions, as applicable for type of piping specified, at connections to equipment and on bypasses.
 - a) Make connections of dissimilar metals with di-electric unions.
 - b) Install valves and unions ahead of traps and strainers. Provide unions on both sides of traps.
 - 2) Do not use reducing bushings, street elbows, bull head tees, close nipples, or running couplings.
 - 3) Install liquid piping systems so they may be easily drained. Provide drain valves at low points and manual air vents at high points in hot water heating and cooling water piping.
 - 4) Install piping to insure noiseless circulation.
 - 5) Place valves and specialties to permit easy operation and access. Valves shall be regulated, packed, and glands adjusted at completion of work before final acceptance.
 - c. Do not install piping in shear walls.
 2. Properly make adequate provisions for expansion, contraction, slope, and anchorage.
 - a. Cut piping accurately for fabrication to measurements established at site. Remove burr and cutting slag from pipes.
 - b. Work piping into place without springing or forcing. Make piping connections to pumps and other equipment without strain at piping connection. Remove bolts in flanged connections or disconnect piping to demonstrate that piping has been so connected, if requested.
 - c. Make changes in direction with proper fittings.

3. Provide sleeves around pipes passing through concrete or masonry floors, walls, partitions, or structural members. Do not place sleeves around soil, waste, vent, or roof drain lines passing through concrete floors on grade. Seal sleeves with specified sealants.
 - a. Sleeves through floors shall extend **1/4 inch** above floor finish in mechanical equipment rooms above basement floor. In other rooms, sleeves shall be flush with floor.
 - b. Sleeves through floors and foundation walls shall be watertight.
 4. Provide spring clamp plates (escutcheons) where pipes run through walls, floors, or ceilings and are exposed in finished locations of building. Plates shall be chrome plated heavy brass of plain pattern and shall be set tight on pipe and to building surface.
 5. Remove dirt, grease, and other foreign matter from each length of piping before installation.
 - a. After each section of piping used for movement of water or steam is installed, flush with clean water, except where specified otherwise.
 - b. Arrange temporary flushing connections for each section of piping and arrange for flushing total piping system.
 - c. Provide temporary cross connections and water supply for flushing and drainage and remove after completion of work.
- D. Penetration Firestops: Install Penetration Firestop System appropriate for penetration at HVAC system penetrations through walls, ceilings, roofs, and top plates of walls.
- E. Sealants:
1. Seal openings through building exterior caused by penetrations of elements of HVAC systems.
 2. Furnish and install acoustical sealant to seal penetrations through acoustically insulated walls and ceilings.

3.5 REPAIR / RESTORATION

- A. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown.
 2. Surface finishes shall exactly match existing finishes of same materials.

3.6 FIELD QUALITY CONTROL

- A. Field Tests:
1. Perform tests on HVAC piping systems. Furnish devices required for testing purposes.
- B. Non-Conforming Work:
1. Replace material or workmanship proven defective with sound material at no additional cost to Owner.
 2. Repeat tests on new material, if requested.

3.7 SYSTEM START-UP

- A. Off-Season Start-up:
1. If Substantial Completion inspection occurs during heating season, schedule spring start-up of cooling systems. If inspection occurs during cooling season, schedule autumn start-up for heating systems.
 2. Notify Owner seven days minimum before scheduled start-up.
 3. Time will be allowed to completely service, test, check, and off-season start systems. During allowed time, train Owner's representatives in operation and maintenance of system.
 4. At end of off-season start-up, furnish Owner with letter confirming that above work has been satisfactorily completed.

- B. Preparations that are to be completed before start up and operation include, but are not limited to, following:
 - 1. Dry out electric motors and other equipment to develop and properly maintain constant insulation resistance.
 - 2. Make adjustments to insure that:
 - a. Equipment alignments and clearances are adjusted to allowable tolerances.
 - b. Nuts and bolts and other types of anchors and fasteners are properly and securely fastened.
 - c. Packed, gasketed, and other types of joints are properly made up and are tight and free from leakage.
 - d. Miscellaneous alignments, tightenings, and adjustments are completed so systems are tight and free from leakage and equipment performs as intended.
 - 3. Motors and accessories are completely operable.
 - 4. Inspect and test electrical circuitry, connections, and voltages to be properly connected and free from shorts.
 - 5. Adjust drives for proper alignment and tension.
 - 6. Make certain filters in equipment for moving air are new and of specified type.
 - 7. Properly lubricate and run-in bearings in accordance with Manufacturer's directions and recommendations.

3.8 CLEANING

- A. Clean exposed piping, ductwork, and equipment.
- B. Replace filters in equipment for moving air with new filters of specified type no more than one week before Final Inspection.

3.9 CLOSEOUT ACTIVITIES

- A. Instruction Of Owner:
 - 1. Instruct building maintenance personnel and Stake Physical Facilities Representative in operation and maintenance of mechanical systems utilizing Operation And Maintenance Manual when so doing:
 - a. Minimum Instruction Periods:
 - 1) HVAC and Refrigeration: Two (2) hours.
 - 2) Temperature Control: Two (2) hours.
 - b. Conduct instruction periods after Substantial Completion inspection when systems are properly working and before final payment is made. None of these instructional periods shall overlap another.

3.10 PROTECTION

- A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system. Cap or plug open ends of pipes and equipment to keep dirt and other foreign materials out of system. Do not use plugs of rags, wool, cotton waste, or similar materials.
- B. Do not operate pieces of equipment used for moving supply air without proper air filters installed properly in system.

END OF SECTION

SECTION 23 0529

HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
1. Common hanger and support requirements and procedures for HVAC systems.

1.2 SUBMITTALS

- A. Action Submittals:
1. Product Data:
 - a. Manufacturer's catalog data for each manufactured item.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

- A. Manufacturers:
1. Class Two Quality Standard Approved Manufacturers. See Section 01 6200:
 - a. Anvil International, Portsmouth, NH www.anvilintl.com.
 - b. Cooper B-Line, Highland, IL www.cooperblinc.com.
 - c. Erico International, Solon, OH www.erico.com.
 - d. Hilti Inc, Tulsa, OK www.hilti.com.
 - e. Minerallac, Hampshire, IL www.minerallac.com.
 - f. Thomas & Betts, Memphis, TN www.superstrut.com.
 - g. Unistrut, Wayne, MI www.unistrut.com.

- B. Performance:

1. Design Criteria:

- a. Support rods for single pipe shall be in accordance with following table:

Rod Diameter	Pipe Size	Rod Diameter	Pipe Size
3/8 inch	2 inches and smaller	10 mm	50 mm and smaller
1/2 inch	2-1/2 to 3-1/2 inches	13 mm	63 mm to 88 mm
5/8 inch	4 to 5 inches	16 mm	100 mm to 125 mm
3/4 inch	6 inches	19 mm	150 mm

- b. Support rods for multiple pipes supported on steel angle trapeze hangers shall be in accordance with following table:

Rods		Number of Pipes per Hanger for Each Pipe Size						
No.	Diameter	2 Inch	2.5 Inch	3 Inch	4 Inch	5 Inch		
2	3/8 Inch	Two	0	0	0	0		
2	1/2 Inch	Three	Three	Two	0	0		
2	5/8 Inch	Six	Four	Three	Two	0		
2	5/8 Inch	Nine	Seven	Five	Three	Two		

2	5/8 Inch	Twelve	Nine	Seven	Five	Three		

- 1) Size trapeze angles so bending stress is less than 10,000 psi.

C. Materials:

1. Hangers, Rods, Channels, Attachments, And Inserts:
 - a. Galvanized and UL approved for service intended.
 - b. Support horizontal piping from clevis hangers or on roller assemblies with channel supports, except where trapeze type hangers are explicitly shown on Drawings. Hangers shall have double nuts.
 - c. Class Two Quality Standards:
 - 1) Support insulated pipes with clevis hanger equal to Anvil Fig 260 or roller assembly equal to Anvil Fig 171 with an insulation protection shield equal to Anvil Fig 167. Gauge and length of shield shall be in accordance with Anvil design data.
 - 2) Except uninsulated copper pipes, support uninsulated pipes from clevis hanger equal to Anvil Fig 260. Support uninsulated copper pipe from hanger equal to Anvil Fig CT-65 copper plated hangers and otherwise fully suitable for use with copper tubing.
 - d. Riser Clamps For Vertical Piping:
 - 1) Class Two Quality Standard: Anvil Figure 261.
 - 2) Class Two Quality Standards:
 - a) Standard Inserts: Anvil Figure 282.
 - 3) Class One Quality Standards:
 - a) Continuous Inserts: Unistrut P-3200 series.
 - b) Acceptable Manufacturers: Hilti, Thomas & Betts.
 - c) Equal as approved by Architect before installation. See Section 01 6200.Steel
 - e. Deck Bracket:
 - 1) 6 inch length minimum.
 - 2) Class One Quality Standard: Unistrut P1000 with clamp nut.
 - 3) Acceptable Manufacturers: Hilti, Thomas & Betts.
 - 4) Equal as approved by Architect before installation. See Section 01 6200.
 - f. Furnace / Fan Coil Support Channel:
 - 1) Class One Quality Standard: Unistrut P1000.
 - 2) Acceptable Manufacturers: Hilti, Thomas & Betts.
 - 3) Equal as approved by Architect before installation. See Section 01 6200.
 - g. Swivel Attachment:
 - 1) Class One Quality Standard: Unistrut EM3127.
 - 2) Acceptable Manufacturers: Hilti, Thomas & Betts.
 - 3) Equal as approved by Architect before installation. See Section 01 6200.

EXECUTION

2.2 INSTALLATION

A. Piping:

1. Properly support piping and make adequate provisions for expansion, contraction, slope, and anchorage.
 - a. Except for underground pipe, suspend piping from roof trusses or clamp to vertical walls using support channels and clamps. Do not hang pipe from other pipe, equipment, or ductwork. Laying of piping on any building element is not allowed.
 - b. Supports For Horizontal Piping:
 - 1) Support metal piping at 96 inches on center maximum for pipe 1-1/4 inches or larger and 72 inches on center maximum for pipe 1-1/8 inch or less.
 - 2) Support thermoplastic pipe at 48 inches on center maximum.
 - 3) Provide support at each elbow. Install additional support as required.
 - c. Supports for Vertical Piping:

- 1) Place riser clamps at each floor or ceiling level.
- 2) Securely support clamps by structural members, which in turn are supported directly from building structure.
- 3) Provide clamps as necessary to brace pipe to wall.
- d. Insulate hangers for copper pipe from piping by means of at least two layers of Scotch 33 plastic tape.
- e. Expansion of Thermoplastic Pipe:
 - 1) Provide for expansion in every 30 feet of straight run.
 - 2) Provide 12 inch offset below roof line in each vent line penetrating roof.

END OF SECTION

SECTION 23 0548

VIBRATION AND SEISMIC CONTROL FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Quality of and requirements for anchorage and seismic restraint systems and vibration isolation systems for HVAC piping and equipment.

1.2 REFERENCES

- A. Association Publications:
 - 1. Federal Emergency Management Agency (FEMA) / Vibration Isolation and Seismic Control Manufacturers Association (VISCMA) / American Society of Civil Engineers (ASCE):
 - a. FEMA 412, 'Installing Seismic Restraints For Mechanical Equipment' (December 2002).
 - 2. Vibration Isolation and Seismic Control Manufacturers Association (VISCMA):
 - a. VISCMA 101-12, 'Seismic Restraint Specification Guidelines for Mechanical, Electrical, and Plumbing Systems'.
 - b. VISCMA 102-12, 'Vibration Isolation Specification Guidelines for Mechanical, Electrical, and Plumbing Systems'.
- B. Definitions:
 - 1. Vibration Isolation: Vibration reduction in which an isolation system is placed between the source of unwanted vibration and an item which needs to be shielded from the vibration.
- C. Reference Standards:
 - 1. American National Standards Institute / Sheet Metal And Air Conditioning Contractors' National Association:
 - a. ANSI/SMACNA 001-2008, 'Seismic Restraint Manual: Guidelines For Mechanical Systems' (3rd Edition).
 - 2. American Society of Civil Engineers / Structural Engineering Institute:
 - a. ASCE/SEI 7-10, 'Minimum Design Loads for Buildings and Other Structures'.
 - 1) Chapter 13, 'Seismic Design Requirements For Nonstructural Components'.
 - 3. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):
 - a. 2011 ASHRAE Handbook - HVAC Applications.
 - 1) Chapter 48, 'Noise and Vibration Control'.
 - 2) Chapter 55, 'Seismic- and Wind-Resistant Design'.
 - 4. ASTM International:
 - a. ASTM A615/A615M-12, 'Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement'.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Restraint system and anchorage method to be used for each piece of equipment.
 - b. Seismic restraints and calculations for all flexible mounted equipment.
 - c. Vibration isolators and flexible couplings.
 - d. Clearly outlined procedures for installing and adjusting isolators, seismic bracing anchors, and snubbers.

2. Shop Drawings:
 - a. Show size, hanger length, and location of seismic restraints for piping and ductwork.
 - b. Show details for each isolator and seismic brace with snubbers proposed for specified equipment.
 - c. Show details for proposed structural steel frames and rails and for anchors to be used in conjunction with isolation of equipment.
 - d. Show locations of piping and ductwork restraints on installation and fabrication floor plans (not bid set of documents of floor plans), noting size and type of restraint to be used.
 - e. Show details of supports, hangers, anchorage, and bracing for isolated equipment as designed or proposed by professional engineer employed by Restraint Manufacturer and qualified with seismic experience in bracing for mechanical equipment. Shop drawings submitted for seismic bracing and anchors shall bear engineer's signed professional seal.
 - f. Include anchor bolt calculations, signed and stamped by registered engineer, showing adequacy of bolt sizing and type.
 - 1) Calculations shall include anchor embedment, minimum edge distance and minimum center distance.
 - 2) Design lateral forces shall be distributed in proportion to mass distribution of equipment.
 - 3) Furnish calculations for anchors on restraint devices, cable, isolators, and on rigidly mounted equipment.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 1. System design and installation shall meet seismic requirements as defined in ASCE/SEI 7-10, 'Minimum Design Loads for Buildings and Other Structures' and applicable state and local codes in accordance with minimum restraint capability of 1.0 g.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

- A. Manufacturers:
 1. Type One Acceptable Manufacturers:
 - a. Amber / Booth Company, Houston, TX www.amberbooth.com.
 - b. Mason Industries Inc, Hauppauge, NY www.mason-ind.com.
 - c. Vibration Mountings and Control Inc, Bloomington, NJ (201) 838-1780.
 - d. Equal as approved by Architect before bidding. See Section 01 6200.
- B. Performance:
 1. Design Criteria:
 - a. Isolation And Seismic Equipment:
 - 1) Piping: Restrain piping in accordance with ANSI/SMACNA 001 Seismic Restraint Manual, Chapter 4, Figures 4.11 to 4.19.
 - 2) Equipment with Fixed Anchor or Support:
 - a) Restraint designed according to ASCE/SEI 7-10, Chapter 13, 'Seismic Design Requirements For Nonstructural Components'.
 - b) Horizontal force factor for elements of structures:
 - (1) In addition, vertical force restraint requirement shall be computed at 1/2 value of horizontal forces.
 - (2) Restrain equipment not anchored directly to floors by cable system designed and furnished by Restraint Manufacturer.
 - 3) Ductwork: Restrain ductwork in accordance with ANSI/SMACNA 001 Seismic Restraint Manual, Chapter 4, Figures 4.2 to 4.10 as appropriate.
 - b. Vibration Isolation Requirements:

- 1) Isolate equipment from structure by means of resilient vibration and noise isolators.
- 2) Unless otherwise noted, isolate HVAC equipment one horsepower and over from structure by means of resilient vibration and noise isolators in accordance with ASHRAE 'Handbook - HVAC Applications', Chapter 48, Table 1, 'Design Guidelines for HVAC-Related Background Sound in Rooms'.
- 3) Design and install isolation equipment, hangers, connections, and other isolating devices to prevent transmission of vibration to structure from equipment and associated piping and ductwork.
- 4) For floor-mounted equipment, use recommendations with ASHRAE 'Handbook - HVAC Applications', Chapter 48, Table 1, 'Design Guidelines for HVAC-Related Background Sound in Rooms'.
- 5) For roofs and floors constructed with open web joints, thin long span slabs, wooden construction and unusual light weight construction, evaluate equipment weighing more than 300 pounds to determine additional deflection of structure caused by equipment weight. Isolator deflection shall be 15 times additional deflection or deflection shown in ASHRAE 'Handbook - HVAC Applications', Chapter 48, Table 1, 'Design Guidelines for HVAC-Related Background Sound in Rooms', whichever is greater.
- 6) Under-Equipment Spring Isolators:
 - a) Equal to Mason SSLFH earthquake motion restrained spring mounts with freestanding stable steel springs, leveling bolts, corrosion resistant finish, motion limiting design, uplift restraining bolts, and 1/4 inch ribbed neoprene noise stop pad.
 - b) Isolators shall accept force in any direction up to 1.0 g without failure, and shall limit movement to 3/4 inch in any direction.
 - c) Springs shall have 50 percent overload capacity.
 - d) Size as required to achieve specified static deflection.
 - e) Outer diameter of spring proper shall not be less than 0.8 of spring height when in loaded position.
- 7) Overhead Support Spring And Rubber Hangers:
 - a) Combination spring and neoprene hangers.
 - b) Hanger bracket shall have 500 percent overload capability and shall allow up to 15 degree hanger rod misalignment without short-circuiting.
 - c) Springs shall have 50 percent overload capacity.
 - d) Provide seismic bracing as required.
- 8) Isolate piping and ductwork in mechanical equipment room and piping and ductwork three supports away or 50 feet from other mechanical equipment, whichever is greater, from structure by means of vibration and noise isolators.
 - a) Isolate suspended piping with combination spring and fiberglass hangers in supporting rods.
 - b) Support floor-mounted piping directly on spring mounts.
- 9) Isolate vertical pipe risers from structure using vibration and noise isolating expansion hangers having minimum rated deflection of four times anticipated pipe movement. Enclose in housing for fail-safe equipment.
- 10) Incorporate flexible connectors in piping adjacent to reciprocating equipment.
- 11) Incorporate flexible connections in ductwork adjacent to air-moving units.
- 12) Elastomeric Isolator: Neoprene or high quality synthetic rubber with anti-ozone and anti-oxidant additives.
- 13) Nuts, Bolts, And Washers: Electroplated zinc.
- 14) Isolators Exposed To Weather: Cadmium plated and neoprene coated springs.
- c. Seismic Requirements:
 - 1) Mechanical equipment, piping, and ductwork shall be braced, snubbed, or supported to withstand seismic disturbances and remain operational.
 - 2) Seismic restraint equipment and resilient isolation devices shall be designed and furnished by single Manufacturer:

C. Finishes:

1. Clean and paint steel components. Thoroughly clean structural steel bases of welding slag and prime with zinc-chromate or metal etching primer. Etch and paint hot dipped galvanized steel components.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Isolation Equipment:

1. Mount vibration isolated equipment on rigid steel frames or concrete bases unless Equipment Manufacturer certifies direct attachment capability.
2. Install snubbers with factory set clearances.
3. Piping:
 - a. Protect isolated and non-isolated piping **2-1/2 inches** inside diameter and larger in all planes by restraints to accommodate thermal movement as well as restrain seismic motions.
 - b. Locations shall be as scheduled and include, but not be limited to:
 - 1) At drops to equipment and at flexible connections.
 - 2) At 45 degree or greater changes in direction of pipe.
 - 3) At horizontal runs of pipe **30 feet** maximum on center spacing.
 - 4) Gas piping shall have additional restraints as scheduled.

4. Ductwork:

- a. Protect isolated and non-isolated rectangular ductwork **4 feet square** in cross-sectional area and larger in all planes by restraints to accommodate thermal movement as well as restrain seismic motion.
- b. Locations shall be determined by Seismic Restraint Manufacturer and include, but not be limited to:
 - 1) Horizontal runs of ductwork **30 feet** maximum on center spacing.
 - 2) 45 degree or greater changes in direction of ductwork.
 - 3) Each end of duct runs and drops of equipment.
 - 4) Each flexible connection.

- #### **B. Vibration Isolation:** Install piping and ductwork to prevent transmission of noise and vibration into structure.

END OF SECTION

SECTION 23 0713

DUCT INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install thermal wrap duct insulation as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 23 3114: 'Low-Pressure Metal Ducts'.
 - 2. Section 23 3300: 'Acoustic Duct Accessories' for duct liner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer Contact List:
 - 1. Certainteed St Gobain, Valley Forge, PA www.certainteed.com.
 - 2. Johns-Manville, Denver, CO www.jm.com.
 - 3. Knauf Fiber Glass, Shelbyville, IN www.knauffiberglass.com or Toronto, ON (416) 593-4322.
 - 4. Manson Insulation Inc, Brossard, QB www.isolationmanson.com.
 - 5. Owens-Corning, Toledo, OH or Owens-Corning Canada Inc, Willowdale, ON www.owenscorning.com.

2.2 MATERIALS

- A. Thermal Wrap Duct Insulation:
 - 1. 1-1/2 inch or 3 inch thick fiberglass with factory-laminated, reinforced aluminum foil scrim kraft facing and density of 0.75 lb / per cu ft.
 - 2. Thermal Conductivity: 0.27 BTU in/HR SF deg F at 75 deg F maximum.
 - 3. Type One Acceptable Products:
 - a. Type 75 standard duct insulation by Certainteed St Gobain.
 - b. Microlite FSK by Johns-Manville.
 - c. Duct Wrap FSK by Knauf Fiber Glass.
 - d. Alley Wrap FSK by Manson Insulation Inc.
 - e. FRK by Owens-Corning.
 - f. Equal as approved by Architect before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Thermal Wrap Duct Insulation:
 - 1. Install insulation as follows:
 - a. Within Building Insulation Envelope:
 - 1) 1-1/2 inches thick on rectangular outside air ducts and combustion air ducts.
 - 2) 1-1/2 inches thick on all round ducts.
 - b. Outside Building Insulation Envelope:

- 1) 3 inch thick on round supply and return air ducts.
 - 2) 1-1/2 inch thick on rectangular, acoustically lined, supply and return air ducts.
 2. Wrap insulation tightly on ductwork with circumferential joints butted and longitudinal joints overlapped minimum 2 inches.
 - a. Do not compress insulation except in areas of structural interference. Minimum thickness at corners shall be one inch thick.
 - b. Remove insulation from lap before stapling.
 - c. Staple seams at approximately 16 inches on center with outward clenching staples.
 - d. Seal seams with foil vapor barrier tape or vapor barrier mastic. Seal penetrations of facing to provide vapor tight system.
- B. Insulate outside of ceiling diffusers, diffuser drops, and duct silencers same as ductwork.

END OF SECTION

SECTION 23 0719

HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install insulation on above ground refrigerant piping and fittings as described in Contract Documents.
 - 2. Furnish and install insulation for hot water heating and return piping system as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 23 0501: 'General HVAC Requirements'.

1.2 DELIVERY, STORAGE, AND HANDLING

- A. Storage And Handling Requirements:
 - 1. Keep materials and work dry and free from damage.
 - 2. Replace wet or damaged materials at no additional cost to Owner.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Armacell, Mebane, NC www.armacell.com.
 - b. Childers Products Co, Eastlake, OH www.fosterproducts.com.
 - c. Foster Products Corp, Oakdale, MN www.fosterproducts.com.
 - d. Johns-Manville, Denver, CO www.jm.com.
 - e. Knauf, Shelbyville, IN www.knauffiberglass.com.
 - f. Manson, Brossard, BC, Canada www.isolationmanson.com.
 - g. Nitron Industries, Thousand Oaks, CA www.nitronindustries.com.
 - h. Owens-Corning, Toledo, OH www.owenscorning.com or Owens-Corning Canada Inc, Willowdale, ON (416) 733-1600.
 - i. Ramco, Lawrenceville, NJ www.ramco.com.
 - j. Nomac, Zebulon, NC www.nomaco.com.
 - k. Speedline Corp, Solon, OH www.speedlinepvc.com.

- B. Materials:
 - 1. Refrigeration Piping System:
 - a. Thickness:

Pipe Size, Outside Diameter	Insulation Thickness
One inch and smaller	3/4 Inch
1-1/8 to 2 inch	3/4 Inch

- 1) **One inch** sheet for fittings as recommended by Manufacturer.
- 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) AP Armaflex 25/50 by Armacell.

- b) Nitrolite by Nitron Industries. White only for exterior.
 - c) Nomaco K-Flex.
- b. Joint Sealer:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Armacell 520 by Armacell.
 - b) Namaco K-Flex R-373.
- c. Insulation Tape:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Armaflex AP Insul Tape by Armacell.
 - b) FT182 Tape by Nitron Industries.
 - c) Elastomeric Foamtape by Nomac K-Flex.
- d. Exterior Finish:
 - 1) For application to non-white, exterior insulation.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) WB Armaflex Finish by Armacell.
 - b) R-374 Protective Coating by Nomaco K-Flex.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before application of insulating materials, brush clean surfaces to be insulated and make free from rust, scale, grease, dirt, moisture, and any other deleterious materials.
- B. Use drop cloths over equipment and structure to prevent adhesives and other materials spotting the work.

3.2 INSTALLATION

- A. Refrigeration System Piping System:
 - 1. General:
 - a. Install insulation in snug contact with pipe.
 - 1) Insulate flexible pipe connectors.
 - 2) Insulate thermal expansion valves with insulating tape.
 - 3) Insulate fittings with sheet insulation and as recommended by Manufacturer.
 - b. Slip insulation on tubing before tubing sections and fittings are assembled keeping slitting of insulation to a minimum.
 - c. Do not install insulation on lines through clamp assembly of pipe support. Butt insulation up against sides of clamp assembly.
 - d. Stagger joints on layered insulation. Seal joints in insulation.
 - e. Install insulation exposed outside building so 'slit' joint seams are placed on bottom of pipe.
 - f. Paint exterior exposed, non-white insulation with two coats of specified exterior finish.
 - 2. System Requirements:
 - a. Condensing Units: Install insulation on above ground refrigerant suction piping and fittings, including thermal bulb, from thermal expansion valve.
 - b. Split System Heat Pump Units: Install insulation on above ground refrigerant liquid and suction piping and fittings.

3.3 FIELD QUALITY CONTROL

- A. Non-Conforming Work:
 - 1. Method of installing insulation shall be subject to approval of Architect. Sloppy or unworkmanlike installations are not acceptable.

3.4 CLEANING

- A. Leave premises thoroughly clean and free from insulating debris.

3.5 PROTECTION

- A. Protect insulation wherever leak from valve stem or other source might drip on insulated surface, with aluminum cover or shield rolled up at edges and sufficiently large in area and of shape that dripping will not splash on surrounding insulation.

END OF SECTION

SECTION 23 1123

FACILITY NATURAL-GAS PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Perform excavation and backfill required for work of this Section.
 - 2. Furnish and install gas piping and fittings within building and from building to meter including connection to meter as described in Contract Documents.
- B. Related Requirements:
 - 1. Sections Under 09 9000 Heading: Painting of exterior piping.
 - 2. Section 23 0501: 'Common HVAC Requirements'.

1.2 REFERENCES

- A. Reference Standards:
 - 1. ASTM International:
 - a. ASTM A53/A53M-12, 'Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless'.
 - b. ASTM A234/A234M-11a, 'Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service'.
 - c. ASTM D2513-12ae1, 'Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings'.

1.3 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Pipe Installers:
 - a. Polyethylene pipe installers shall be properly trained and certified in procedure for joining polyethylene pipe.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Storage And Handling Requirements:
 - 1. Do not store polyethylene pipe so it is exposed to sunlight.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. BrassCraft, Novi, MI www.brasscraft.com.
 - b. Cimberio Valve Co Inc, Malvern, PA www.cimberio.com.
 - c. ConBraCo Industries, Inc, Matthews, NC www.conbraco.com or ConBraCo / Honeywell Ltd, Scarborough, ON (416) 293-8111.
 - d. Dormont Manufacturing Company, Export, PA www.dormont.com.

- e. Jenkins-NH-Canada, Brantford, ON www.jenkins-nh-canada.com.
- f. Jomar International, Madison Heights, MI www.jomar.com.
- g. California Valves (formally KOSO) by Pacific Seismic Products Inc, Lancaster, CA, Distributed by Strand Earthquake Consultants www.strandearthquake.net.
- h. Watts Regulator Co, North Andover, MA www.wattsreg.com or Watts Industries (Canada) Inc, Burlington, ON (888) 208-8927.

B. Materials:

- 1. Above-Ground Pipe And Fittings:
 - a. Black carbon steel, butt welded, Schedule 40 pipe meeting requirements of A53/A53M.
 - b. Welded forged steel fittings meeting requirements of ASTM A234/A234M or standard weight malleable iron screwed.
- 2. Valves:
 - a. **125 psi** bronze body ball valve, UL listed.
 - b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) CIM 102.1 by Cimbrio Valve.
 - 2) Apollo Series 80-100 by ConBraCo.
 - 3) 'Red Cap' R602 by Jenkins NH Canada.
 - 4) Model T-204 by Jomar International.
 - 5) Model B-6000-UL by Watts Regulator.
- 3. Cocks:
 - a. Gauge Cocks: Conbraco Series 50-56 bronze gauge cock.
- 4. Flexible Connector:
 - a. Type 304 stainless steel corrugated tube coated for corrosion protection.
 - b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) Dormont Supr-Safe.
 - 2) BrassCraft Procoat.
 - 3) Size to be determined by total **cu ft** per hour gas flow requirement of building and following conditions: **0.1 inch** water column maximum allowable pressure-drop through valve with available pressure of **4 oz**.
 - 4) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
 - a) California Seismic Gas Shutoff Valve (formally KOSO):
 - (1) Horizontal installation: Model 314F or 315F.
 - (2) Vertical installation with bottom inlet: Model VB314F or VB315F.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Steel pipe installed through air plenums, in walls, and pipes **2-1/2 inches** and larger shall have welded fittings and joints. Other steel pipe may have screwed or welded fittings.
- B. Lay underground pipe in accordance with Manufacturer's recommendations and local gas utility company regulations and specifications.
 - 1. Provide **24 inch** minimum steel pipe between vertical rise of riser and end of polyethylene line if anode-less riser is not used. Use plastic-to-steel transition or compression fitting between end of polyethylene line and steel meter riser. Provide cathodic protection for steel riser or use anode-less riser.
 - 2. Place tracer wire along side of polyethylene pipe from meter to point where pipe rises inside building.
 - 3. Place **4 inches** of sand around gas line buried underground.
 - 4. Do not install gas piping under building floor slabs-on-grade.
- C. On lines serving gas-fired equipment, install gas cocks adjacent to equipment outside of equipment cabinet and easily accessible.

- D. Install **6 inch** long minimum dirt leg, with pipe cap, on vertical gas drop serving each gas-fired equipment unit.
- E. Use fittings for changes of direction in pipe and for branch runouts.

3.2 FIELD QUALITY CONTROL

- A. Field tests:
 - 1. Subject all portions of gas piping system, in sections or in entirety, to air pressure of **75 psig** and prove airtight for 4 hours.
 - 2. Disconnect equipment not suitable for **75 psig** pressure from piping system during test period.

END OF SECTION

SECTION 23 2300

REFRIGERANT PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install piping and specialties for refrigeration systems as described in Contract Documents.

1.2 REFERENCES

- A. Association Publications:
 - 1. Federal Emergency Management Agency (FEMA) / Vibration Isolation and Seismic Control Manufacturers Association (VISCMA) / American Society of Civil Engineers (ASCE):
 - a. FEMA 412, 'Installing Seismic Restraints For Mechanical Equipment' (December 2002).
 - 2. Vibration Isolation and Seismic Control Manufacturers Association (VISCMA):
 - a. VISCMA 101-12, 'Seismic Restraint Specification Guidelines for Mechanical, Electrical, and Plumbing Systems'.
 - b. VISCMA 102-12, 'Vibration Isolation Specification Guidelines for Mechanical, Electrical, and Plumbing Systems'.
- B. Definitions:
 - 1. Refrigerant: Absorbs heat by a change of state (evaporation) from liquid to a gas, and releases heat by a change of state (condenses) from gas back to a liquid.
 - 2. Vibration Isolation: Vibration reduction in which an isolation system is placed between the source of unwanted vibration and an item which needs to be shielded from the vibration.
- C. Reference Standards:
 - 1. American National Standards Institute (ANSI) / American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):
 - a. ANSI/ASHRAE Standard 15-2010, 'Safety Standard for Refrigeration Systems'.
 - b. ANSI/ASHRAE Standard 34-2010, 'Designation and Classification of Refrigerants'.
 - 2. American National Standards Institute / American Welding Society:
 - a. ANSI/AWS A5.8M/A5.8-2011, 'Specification for Filler Metals for Brazing and Braze Welding'.
 - 3. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):
 - a. '2011 ASHRAE Handbook - HVAC Applications'.
 - 1) Chapter 48, 'Noise and Vibration Control'.
 - 4. ASTM International:
 - a. ASTM A36/A36M-08, 'Standard Specification for Carbon Structural Steel'.
 - b. ASTM B280-08, 'Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service'.
 - 5. National Fire Protection Association / American National Standards Institute:
 - a. NFPA 90A-2012, 'Installation of Air Conditioning and Ventilating Systems'.
 - 6. Underwriters Laboratories:
 - a. UL 2182, 'Refrigerants' (2nd Edition).

1.3 SUBMITTALS

- A. Action Submittals:

1. Shop Drawings: Show each individual equipment and piping support.

B. Informational Submittals:

1. Qualification Statements: Technician certificate for use of HFC and HCFC refrigerants.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:

1. Refrigerants:

- a. Underwriters Laboratories / Underwriters Laboratories of Canada:
 - 1) Comply with requirements of UL 2182.

B. Qualifications. Section 01 4301 applies, but is not limited to the following:

1. Installer: Refrigerant piping shall be installed by refrigeration contractor licensed by State and by technicians certified in use of HFC and HCFC refrigerants.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Manufacturers:

1. Manufacturer Contact List:

- a. Airtec, Fall River, MA, www.noventcaps.com.
- b. Cush-A-Clamp by ZSI Manufacturing, Canton, MI www.cushaclamp.com.
- c. Elkhart Products Corp, Elkhart, IN www.elkhartproducts.com.
- d. Emerson Climate Technologies, St Louis, MO www.emersonflowcontrols.com.
- e. Handy & Harman Products Division, Fairfield, CT www.handy-1.com.
- f. Harris Products Group, Cincinnati, OH www.harrisproductsgroup.com.
- g. Henry Valve Co, Melrose Park, IL www.henrytech.com.
- h. Hilti Inc, Tulsa, OK www.hilti.com.
- i. Hydra-Zorb Co, Auburn Hills, MI www.hydra-zorb.com.
- j. JB Industries, Aurora, IL www.jbind.com.
- k. Mueller Steam Specialty, St Pauls, NC www.muellersteam.com.
- l. Nibco Inc, Elkhart, IN www.nibco.com.
- m. Packless Industries, Waco, TX www.packless.com.
- n. Parker Corp, Cleveland, OH www.parker.com.
- o. Sporlan Valve Co, Washington, MO www.sporlan.com.
- p. Sherwood Valves, Washington, PA www.sherwoodvalve.com.
- q. Thomas & Betts, Memphis, TN www.superstrut.com.
- r. Unistrut, Div of Atkore International, Inc., Harvey, IL www.unistrut.com.
- s. Universal Metal Hose, Chicago, IL www.universalmetalhose.com.
- t. Vibration Mountings & Controls, Bloomington, NJ www.vmc-kdc.com.
- u. Virginia KMP Corp, Dallas, TX www.virginiakmp.com.

B. Materials:

1. Refrigerant Piping:

- a. Meet requirements of ASTM B280, hard drawn straight lengths. Soft copper tubing not permitted.
- b. Do not use pre-charged refrigerant lines.

2. Refrigerant Fittings:

- a. Wrought copper with long radius elbows.
- b. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
 - 1) Mueller Streamline.
 - 2) Nibco Inc.

- 3) Elkhart.
3. Suction Line Traps:
 - a. Manufactured standard one-piece traps.
 - b. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
 - 1) Mueller Streamline.
 - 2) Nibco Inc.
 - 3) Elkhart.
4. Tee Access:
 - a. Brass:
 - 1) Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
 - a) JB Industries: Part #A3 Series with Factory Cap and Valve Core.
5. Connection Material:
 - a. Brazing Rods in accordance with ANSI/AWS A5.8M/A5.8:
 - 1) Copper to Copper Connections:
 - a) Classification BCuP-4 Copper Phosphorus (6 percent silver).
 - b) Classification BCuP-5 Copper Phosphorus (15 percent silver).
 - 2) Copper to Brass or Copper to Steel Connections: Classification BAg-5 Silver (45 percent silver).
 - 3) Do not use rods containing Cadmium.
 - b. Flux:
 - 1) Type Two Acceptable Products:
 - a) Stay-Silv White Brazing Flux by Harris Products Group.
 - b) High quality silver solder flux by Handy & Harmon.
 - c) Equal as approved by Architect before use. See Section 01 6200.
6. Valves:
 - a. Expansion Valves:
 - 1) For pressure type distributors, externally equalized with stainless steel diaphragm, and same refrigerant in thermostatic elements as in system.
 - 2) Size valves to provide full rated capacity of cooling coil served. Coordinate selection with evaporator coil and condensing unit.
 - 3) Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
 - a) Emerson Climate Technologies.
 - b) Henry.
 - c) Mueller.
 - d) Parker.
 - e) Sporlan.
 - b. Manual Refrigerant Shut-Off Valves:
 - 1) Ball valves designed for refrigeration service and full line size.
 - 2) Valve shall have cap seals.
 - 3) Valves with hand wheels are not acceptable.
 - 4) Provide service valve on each liquid and suction line at compressor.
 - 5) If service valves come as integral part of condensing unit, additional service valves shall not be required.
 - 6) Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
 - a) Henry.
 - b) Mueller.
 - c) Sherwood.
 - d) Virginia.
7. Filter-Drier:
 - a. On lines **3/4 inch** outside diameter and larger, filter-drier shall be replaceable core type with Schraeder type valve.
 - b. On lines smaller than **3/4 inch** outside diameter, filter-drier shall be sealed type with brazed end connections.
 - c. Size shall be full line size.
 - d. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:

- 1) Emerson Climate Technologies.
 - 2) Mueller.
 - 3) Parker.
 - 4) Sporlan.
 - 5) Virginia.
8. Sight Glass:
- a. Combination moisture and liquid indicator with protection cap.
 - b. Sight glass shall be full line size.
 - c. Sight glass connections and sight glass body shall be solid copper or brass, no copper-coated steel sight glasses allowed.
 - d. Category Four Approved Product. See Section 01 6200 for definitions of Categories:
 - 1) HMI by Emerson Climate Technologies.
9. Flexible Connectors:
- a. Designed for refrigerant service with bronze seamless corrugated hose and bronze braiding.
 - b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) Vibration Absorber Model VAF by Packless Industries.
 - 2) Vibration Absorbers by Virginia KMP Corp.
 - 3) Anaconda 'Vibration Eliminators' by Universal Metal Hose.
 - 4) Style 'BF' Spring-flex freon connectors by Vibration Mountings.
10. Refrigerant Piping Supports:
- a. Base, Angles, And Uprights: Steel meeting requirements of ASTM A36.
 - b. Securing Channels:
 - 1) At Free-Standing Pipe Support:
 - a) Class One Quality Standard: P-1000 channels by Unistrut.
 - b) Acceptable Manufacturers: Hilti, Thomas & Betts.
 - c) Equal as approved by Architect before installation. See Section 01 6200.
 - 2) At Wall Support:
 - a) Class One Quality Standard: P-3300 channels by Unistrut.
 - b) Acceptable Manufacturers: Hilti, Thomas & Betts.
 - c) Equal as approved by Architect before installation. See Section 01 6200.
 - 3) At Suspended Support:
 - a) Class One Quality Standard: P-1001 channels by Unistrut.
 - b) Acceptable Manufacturers: Hilti, Thomas & Betts.
 - c) Equal as approved by Architect before installation. See Section 01 6200.
 - 4) Angle Fittings:
 - a) Class One Quality Standard: P-2626 90 degree angle by Unistrut.
 - b) Acceptable Manufacturers: Hilti, Thomas & Betts.
 - c) Equal as approved by Architect before installation. See Section 01 6200.
 - c. Pipe Clamps:
 - 1) Type Two Acceptable Manufacturers:
 - a) Hydra-Zorb.
 - b) ZSI Cush-A-Clamp.
 - c) Hilti Cush-A-Clamp.
 - d) Equal as approved by Architect before installation. See Section 01 6200.
 - d. Protective Cover: 18 ga steel, hot-dipped galvanized.
11. Locking Refrigerant Cap:
- a. Provide and install on charging valves:
 - 1) Class One Quality Standard: 'No Vent' locking refrigerant cap.
 - 2) Acceptable Manufacturers: Airtec.
 - 3) Equal as approved by Architect before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Refrigerant Lines:

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1. Install as high in upper mechanical areas as possible. Do not install underground or in tunnels.
 2. Slope suction lines down toward compressor **one inch/10 feet**. Locate traps at vertical rises against flow in suction lines.
- B. Connections:
1. Refrigeration system connections shall be copper-to-copper, copper-to-brass, or copper-to-steel type properly cleaned and brazed with specified rods. Use flux only where necessary. No soft solder (tin, lead, antimony) connections will be allowed in system.
 2. Braze manual refrigerant shut-off valve, sight glass, and flexible connections.
 3. Circulate dry nitrogen through tubes being brazed to eliminate formation of copper oxide during brazing operation.
- C. Specialties:
1. Install valves and specialties in accessible locations. Install refrigeration distributors and suction outlet at same end of coil.
 2. Install thermostatic bulb as close to cooling coil as possible. Do not install on vertical lines.
 3. Install equalizing line in straight section of suction line, downstream of and reasonably close to thermostatic bulb. Do not install on vertical lines.
 4. Provide flexible connectors in each liquid line and suction line at both condensing unit and evaporator on systems larger than five tons. Anchor pipe near each flexible connector.
- D. Refrigerant Supports:
1. Support Spacing:
 - a. Piping **1-1/4 inch** And Larger: **8 feet** on center maximum.
 - b. Piping **1-1/8 inch** And Smaller: **6 feet** on center maximum.
 - c. Support each elbow.
 2. Isolate pipe from supports and clamps with Hydrozorb or Cush-A-Clamp systems.
 3. Run protective cover continuous from condensing units to risers or penetrations at building wall.

3.2 FIELD QUALITY CONTROL

- A. Field Tests:
1. Make evacuation and leak tests in presence of owner's representative after completing refrigeration piping systems. Positive pressure test will not suffice for procedure outlined below.
 - a. Draw vacuum on each entire system with two stage vacuum pump. Draw vacuum to 300 microns using micron vacuum gauge capable of reading from atmosphere to 10 microns. Do not use cooling compressor to evacuate system nor operate it while system is under high vacuum.
 - b. Break vacuum with nitrogen and re-establish vacuum test. Vacuum shall hold for 30 minutes at 300 microns without vacuum pump running.
 - c. Conduct tests at **70 deg F** ambient temperature minimum.
 - d. Do not run systems until above tests have been made and systems started up as specified. Inform Owner's Representative of status of systems at time of final inspection and schedule start-up and testing if prevented by outdoor conditions before this time.
 - e. After testing, fully charge system with refrigerant and conduct test with Halide Leak Detector.
 - f. Recover all refrigerant in accordance with applicable codes. Do not allow any refrigerant to escape to atmosphere.
- B. Non-Conforming Work:
1. If it is observed that refrigerant lines are being or have been brazed without proper circulation of nitrogen through lines, all refrigerant lines installed up to that point in time shall be removed and replaced at no additional cost to Owner.

END OF SECTION

SECTION 23 2600

CONDENSATE DRAIN PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Coordinate installation of condensate drain piping with Section 22 0501 as described in Contract Documents.

1.2 REFERENCES

- A. Reference Standards:
 - 1. ASTM International:
 - a. ASTM D1785-12, 'Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120'.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Materials:
 - 1. Condensate Drains:
 - a. Type M copper meeting requirements of ASTM B88 or Schedule 40 PVC for condensate drains from air handling units, fan coil units, and furnace coils.
- B. Condensate Pump:
 - a. Rated at 225 gph at 15 feet total head.
 - b. As supplied by air handler manufacturer. Only where required for drop.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Condensate Drains:
 - 1. Support piping and protect from damage.

END OF SECTION

SECTION 23 3114

LOW-PRESSURE METAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install above-grade low-pressure steel ducts and related items as described in Contract Documents.

1.2 REFERENCES

- A. Reference Standards:
 - 1. ASTM International:
 - a. ASTM A653/A653M-11, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
 - 2. Sheet Metal And Air Conditioning Contractors' National Association / American National Standards Institute:
 - a. SMACNA, 'HVAC Duct Construction Standards - Metal and Flexible' (Third Edition).

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Materials:
 - 1. Sheet Metal:
 - a. Fabricate ducts, plenum chambers and casings of zinc-coated, lock-forming quality steel sheets meeting requirements A653/A653M, with G 60 coating.
 - 2. Duct Sealer For Interior Ducts:
 - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) Duct Butter or Butter Tak by Cain Manufacturing Co Inc, Pelham, AL www.cainmfg.com.
 - 2) DP 1010 by Design Polymerics, Fountain Valley, CA www.designpoly.com.
 - 3) SAS by Duro Dyne, Bay Shore, NY or Duro Dyne Canada, Lachine, QB www.durodyne.com.
 - 4) Iron Grip 601 by Hardcast Inc, Wylie, TX www.hardcast.com.
 - 5) MTS100 or MTS 200 by Hercules Mighty Tough, Denver CO, www.herculesindustries.com.
 - 6) 15-325 by Miracle / Kingco, Div ITW TACC, Rockland, MA www.taccint.com.
 - 7) 44-39 by Mon-Eco Industries Inc, East Brunswick, NJ www.mon-ecoindustries.com.
 - 8) Airseal Zero by Polymer Adhesive Sealant Systems Inc, Weatherford, TX www.polymeradhesives.com.
 - 9) Airseal #22 Water Base Duct Sealer by Polymer Adhesive Sealant Systems Inc, Weatherford, TX www.polymeradhesives.com.
 - 3. Duct Sealer For Exterior Ducts:
 - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) Hardcast DT Tape and RTA-50 liquid adhesive by Hardcast Inc, Wylie, TX www.hardcast.com.

- B. Fabrication:
1. General:
 - a. Straight and smooth on inside with joints neatly finished.
 - b. Duct drops to diffusers shall be round, square, or rectangular to accommodate diffuser neck. Drops shall be same gauge as branch duct. Seal joints air tight.
 2. Standard Ducts:
 - a. General:
 - 1) Ducts shall be large enough to accommodate inside acoustic duct liner. Dimensions shown on Drawings are net clear inside dimensions after duct liner has been installed.
 - b. Rectangular Duct:
 - 1) Duct panels through **48 inch** dimension having acoustic duct liner need not be cross-broken or beaded.
 - a) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) Ductmate Industries Inc, Charleroi, PA www.ductmate.com or Ductmate Canada Ltd, Burlington, ON (905) 332-7678.
 - (2) Ward Industries Inc, Bensonville, IL www.wardind.com.
 - (3) Elgen Manufacturing Company, Inc., East Rutherford, NJ www.elgenmfg.com.
 - c. Round Duct:
 - 1) Spiral Seam: **28 ga** minimum for ducts up to and including **14 inches** in diameter.
 - 2) Longitudinal Seam:
 - a) **28 ga** minimum for ducts up to and including **8 inches** in diameter.
 - b) **26 ga** minimum for ducts over **8 inches** and up to **14 inches** in diameter.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Interface With Other Work: Reseal transverse joint duct leaks and seal longitudinal duct joint leaks discovered during air test and balance procedures specified in Section 01 4546, at no additional cost to Owner.
- B. Install internal ends of slip joints in direction of flow. Seal transverse and longitudinal joints air tight using specified duct sealer. Cover horizontal and longitudinal joints on exterior ducts with two layers of specified tape installed with specified adhesive.
- C. Securely anchor ducts and plenums to building structure with specified duct hangers attached with screws. Do not hang more than one duct from a duct hanger. Brace and install ducts so they shall be free of vibration under all conditions of operation.
- D. Ducts shall not bear on top of structural members.
- E. Paint ductwork visible through registers, grilles, and diffusers flat black.
- F. Properly flash where ducts protrude above roof.
- G. Under no conditions will pipes, rods, or wires be allowed to penetrate ducts.

END OF SECTION

SECTION 23 3346

FLEXIBLE DUCTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install supply air branch duct runouts to diffusers as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 23 3001: Common Duct Requirements.

1.2 REFERENCES

- A. Reference Standards:
 - 1. National Fire Protection Association / American National Standards Institute:
 - a. NFPA 90A: 'Standard for the Installation of Air-Conditioning and Ventilating Systems' (2012 Edition).
 - 2. Underwriters Laboratories:
 - a. UL 181, 'Factory-Made Ducts and Air Connectors' (10th Edition).
 - b. UL 181B, 'Closure Systems for Use With Flexible Air Ducts and Air Connectors' (3rd Edition).

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Anco Products Inc, Elkhart, IN www.ancoproductsinc.com.
 - b. Thermaflex by Flexible Technologies, Abbeville, SC or Mississauga, ON www.thermaflex.net.
 - c. Flexmaster USA Inc, Houston, TX www.flexmasterusa.com or Flexmaster Canada Ltd, Richmond Hill, ON (905) 731-9411.
- B. Materials:
 - 1. Ducts:
 - a. Formable, flexible, circular duct which shall retain its cross-section, shape, rigidity, and shall not restrict airflow after bending.
 - b. Insulation:
 - 1) Nominal 1-1/2 inches, 3/4 lb per cu ft density fiberglass insulation with air-tight, polyethylene or polyester core, sheathed in seamless vapor barrier jacket factory installed over flexible assembly.
 - c. Assembly, including insulation and vapor barrier, shall meet Class I requirement of NFPA 90A and be UL 181 rated, with flame spread of 25 or less and smoke developed rating of 50 or under.
 - d. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) ANCO-FLEX 4625 by Anco Products.
 - 2) M-KC by Thermaflex by Flexible Technologies.

- 3) Type 4m Insulated by Flexmaster.
2. Cinch Bands: Nylon, **3/8 inch** removable and reusable type.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install duct in fully extended condition free of sags and kinks, using **72 inch** maximum lengths.
- B. Make duct connections by coating exterior of duct collar for **3 inches** with duct sealer and securing duct in place over sheet metal collar with specified cinch bands.

END OF SECTION

SECTION 23 3400

HVAC FANS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install exhaust fans as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 23 3001: Common Duct Requirements.
 - 2. Division 26: Control device and electrical connection.

1.2 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Bear AMCA seal and UL label.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer Contact List:
 - 1. Acme Engineering & Manufacturing Corp, Muskogee, OK www.acmefan.com.
 - 2. Breidert Air Products, Jacksonville, FL www.breidert.com.
 - 3. Carnes Co, Verona, MI www.carnes.com.
 - 4. Greenheck Corp, Schofield, WI www.greenheck.com.
 - 5. Loren Cook Co, Springfield, MO www.lorencook.com.
 - 6. PennBarry, Richardson, TX (215) 464-8900 www.pennbarry.com.

2.2 MANUFACTURED UNITS

- A. Ceiling Mounted Exhaust Fans:
 - 1. Acoustically insulated housings. Sound level rating of 4.6 sones maximum for fan RPM and CFM listed on Drawings.
 - 2. Include chatterproof integral back-draft damper with no metal-to-metal contact.
 - 3. True centrifugal wheels.
 - 4. Entire fan, motor, and wheel assembly shall be easily removable without disturbing housing.
 - 5. Suitably ground motors and mount on rubber-in shear vibration isolators.
 - 6. Provide wall or roof cap, as required.
 - 7. Class One Quality Standards:
 - a. Greenheck SP.
 - b. PennBarry Zephyr.
 - 8. Approved Manufacturers. See Section 01 6200.
 - a. Acme, Breidert, Broan, Carnes, Cook-Gemini, Greenheck, PennBarry.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Anchor fan units securely to structure or to curb.

END OF SECTION

SECTION 23 3713

DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install diffusers, registers, and grilles connected to ductwork as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 23 3001: General Duct Requirements.

1.2 SUBMITTALS

- A. Maintenance Material Submittals:
 - 1. Tools: Leave tool for removing core of each different type of grille for building custodian.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer Contact List:
 - 1. Carnes Co, Verona, MI www.carnes.com.
 - 2. J & J Register, Grand Rapids, MI www.jandjreg.com.
 - 3. Krueger Air System Components, Richardson, TX www.krueger-hvac.com.
 - 4. Metal*Aire by Metal Industries Inc, Clearwater, FL www.metalaire.com.
 - 5. Nailor Industries Inc, Houston, TX or Weston, ON www.nailor.com.
 - 6. Price Industries Inc, Suwanee, GA www.price-hvac.com or E H Price Ltd, Winnipeg, MB (204) 669-4220.
 - 7. Titus, Richardson, TX www.titus-hvac.com.
 - 8. Tuttle & Bailey, Richardson, TX www.tuttleandbailey.com.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Anchor securely into openings. Secure frames to ductwork by using four sheet metal screws, one per side.

END OF SECTION

SECTION 23 6213

AIR-COOLED REFRIGERANT COMPRESSOR AND CONDENSER UNITS: Heat Pumps

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install air-cooled heat pumps as described in contract documents.
- B. Related Sections:
 - 1. Section 23 0501: 'Common HVAC Requirements'.
 - 2. Section 23 2300: 'Refrigerant Piping'.

1.2 REFERENCES

- A. Definitions:
 - 1. Compressor: Pump that increases vapor (refrigerant or air) pressure from one level to a higher level of pressure.
 - 2. Condenser: Device used to condense refrigerant in a cooling system.
 - 3. Condenser Coils: In an air conditioner, the coil dissipates heat from the refrigerant, changing the refrigerant from vapor to liquid. In a heat pump system, it absorbs heat from the outdoors.
 - 4. Condensing Unit: Outside section of an air conditioning system which pumps vaporized refrigerant from the evaporator, compresses it, liquefies it in the condenser and returns it to the evaporator coil. The outdoor portion of a split system air conditioner contains the compressor and outdoor coil.
 - 5. Heat Pump: Heat pump is an all electric unit that cools like an air conditioner using refrigerant. Primary difference is that a heat pump can also provide heat by reversing cooling process. Heat pumps extract heat from air even in cold weather, heat exists in the outside air then sends heated refrigerant inside to the coil to heat indoor air. Heat pumps operate efficiently typically at temperatures of 40 deg F and above while a gas furnace is more efficient below 40 deg F.
 - 6. Refrigerant: Absorbs heat by a change of state (evaporation) from liquid to a gas, and releases heat by a change of state (condenses) from gas back to a liquid.
 - 7. SEER (Seasonal Energy Efficiency Ratio): Measure of cooling efficiency for air conditioners and heat pumps. A ratio of total cooling in comparison to electrical energy input in watts per hour. Higher the seer, the more energy efficient the unit. Since 2006, the minimum SEER required by the Department of Energy is 13.00 and 15.00+ SEER is considered high efficiency.
 - 8. Split System: Combination of an outdoor unit (air conditioner or heat pump) with an indoor unit (furnace or air handler). Split systems must be matched for optimum efficiency.
- B. Reference Standards:
 - 1. American National Standards Institute / Air-Conditioning, Heating, and Refrigeration Institute:
 - a. ANSI/AHRI Standard 210/240-2008, 'Performance Rating of Unitary Air-Conditioning & Air-Source Heat Pump Equipment' (formerly ARI Standard 210/240).
 - 2. American National Standards Institute / American Society of Heating, Refrigerating and Air-Conditioning Engineers:
 - a. ANSI/ASHRAE Standard 15-2010, 'Safety Standard for Refrigeration Systems'.
 - b. ANSI/ASHRAE Standard 34-2010, 'Designation and Classification of Refrigerants'.
 - 3. National Fire Protection Association / American National Standards Institute:
 - a. NFPA 70-2011, National Electric Code (NEC).
 - b. NFPA 90A-2012, 'Installation of Air Conditioning and Ventilating Systems'.
 - 4. Underwriters Laboratories:

- a. UL 1995. 'Heating and Cooling Equipment' (4th Edition).
- b. UL 2182, 'Refrigerants' (2nd Edition).

1.3 SUBMITTALS

- A. Informational Submittals:
 - 1. Tests and Evaluation Reports:
 - a. Manufacturer Reports: Equipment check-out sheets.
 - 2. Qualification Statements:
 - a. Technician certificate for use in HFC and HCFC refrigerants.
- B. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Final, executed copy of Warranty.
 - b. Record Documentation:
 - 1) Manufacturers Documentation:
 - a) Equipment checkout sheet: Complete and sign all items for each unit.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Each unit shall be UL / ULC or ETL labeled.
 - 2. Comply with ANSI/AHRI Standard 210/240.
 - 3. Refrigeration compressor, coils, and specialties shall be designed to operate with CFC-free refrigerants.
- B. Qualifications. Section 01 4301 applies, but is not limited to the following:
 - 1. Installer: Refrigerant piping shall be installed by refrigeration contractor licensed by State and by technicians certified in use of HFC and HCFC refrigerants.

1.5 WARRANTY

- A. Manufacturer's Warranty:
 - 1. Provide ten (10) year limited warranty on compressor and five (5) year limited warranty on parts from date of 'start-up'.
 - 2. Record 'start-up' date on warranty certificate for each unit.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

- A. Manufacturer:
 - 1. Manufacturer Contact List:
 - a. Carrier Corporation:
 - 1) Carrier National: Douglas Masch (317) 370-2727 doug.mash@carrier.utc.com.
 - 2) Carrier Utah: Matt Smith 801-224-1020 msmith@mtncor.net.
 - b. Lennox Industries:
 - 1) For pricing and information call Lennox National Account at 1-800-367-6285.
 - c. York International: Brian Michael (405) 419-6230 brian.k.michael@jci.com.
- B. Performance:

1. Capacities: SEER rating as defined by AHRI shall be 13.0 or greater.

C. Manufactured Units:

1. Condensing Units (5 Tons or Less):

- a. General:

- 1) Units shall be operable down to 0 deg F outdoor temperature when design temperature is below 35 deg F.
 - 2) Use R-410a refrigerant.
 - 3) Only one (1) liquid line, one (1) suction line, and one (1) power connection shall be made to each compressor. Provide charging valves.
 - 4) Provide a reversing valve, suction line accumulator, discharge muffler, flow control check valve, and solid-state defrost control utilizing thermistors.
 - 5) Equipment provider/installer shall provide and install defrost cycle kit and balance point sensor. Provide ambient cut-out to send signal back to furnace for either defrost or balance point. Balance point shall be adjustable from 30 deg F to 50 deg F, with a default of 40 deg F.

- b. Condenser Coils:

- 1) Aluminum plate fins mechanically bonded to seamless copper tubes or 'Spine Fin' trade mark system which has aluminum fins epoxy bonded to aluminum tubes or micro-channel.
 - 2) Provide coil guard: Stamped louver or wire type.

- c. Fans:

- 1) Direct driven propeller type.
 - 2) Fan motor shall be single or two speed, thermostatically controlled, permanently lubricated, and designed with permanent protection.
 - 3) Motors shall be resiliently mounted.
 - 4) Each fan shall have a safety guard.

- d. Compressor:

- 1) Each condenser unit shall have only one (1) compressor.
 - 2) Design with following features:
 - a) Externally mounted brass service valves with charging connections.
 - b) Crankcase heater.
 - c) Resilient rubber mounts.
 - d) Compressor motor-overload protection.
 - e) Single speed.

- e. Controls:

- 1) Factory wired and located in separate enclosure.
 - 2) Factory installed safety devices:
 - a) High and low pressure cutout.
 - b) Condenser fan motor-overload devices.
 - 3) Factory installed anti-cycle timers to prevent units from starting up again for five (5) minutes after any power interruption.
 - 4) Low ambient kit.

- f. Casing:

- 1) Fully weatherproof for outdoor installation. Finish shall be weather resistant.

- g. Openings shall be provided for power and refrigerant connections.

- h. Panels shall be removable for servicing.

- i. Category Four Approved Products. See Section 01 6200 for definitions of Categories:

- 1) Carrier: 25HCB3.
 - 2) Lennox: XP13.
 - 3) York: YHJD.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set condensing units level on concrete slab on vibration isolation pads located at each corner of unit. This does not apply to condensing units that have a composite non-metal bottom.
- B. Do not use capillary tube and piston type refrigerant metering devices.

3.2 FIELD QUALITY CONTROL

- A. Manufacturer Services:
 - 1. Air-cooled heat pumps shall be started up, checked out, and adjusted by condensing unit Installer.
 - 2. Use equipment checkout sheet provided by Manufacturer, Complete and sign all items on sheet.

END OF SECTION

SECTION 26 0501

COMMON ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. General electrical system requirements and procedures.
2. Perform excavating and backfilling work required by work of this Division as described in Contract Documents.
3. Make electrical connections to equipment provided under other Sections.
4. Furnish and install Penetration Firestop Systems at electrical system penetrations as described in Contract Documents.

1.2 REFERENCES

A. Reference Standards:

1. National Fire Protection Association / American National Standards Institute:
 - a. NFPA 70-2011, National Electric Code (NEC).
2. National Electrical Manufacturing Association Standards (NEMA):
 - a. NEMA 250-2008, 'Enclosure for Electrical Equipment (1000 Volts Maximum)'.

1.3 SUBMITTALS

A. Action Submittals:

1. Product Data:
 - a. Provide following information for each item of equipment:
 - 1) Catalog Sheets.
 - 2) Assembly details or dimension drawings.
 - 3) Installation instructions.
 - 4) Manufacturer's name and catalog number.
 - 5) Name of local supplier.
 - b. Furnish such information for following equipment:
 - 1) Section 26 2417: 'Circuit-Breaker Panelboards'.
 - 2) Section 26 2816: 'Enclosed Switches And Circuit Breakers'.
 - 3) Section 26 5100: 'Interior Lighting Fixtures'.
 - 4) Section 26 2900 Generator
 - 5) Section 26 2901 Automatic Transfer Switch
 - 6) Section 26 7000 Fire alarm system
 - c. Do not purchase equipment before approval of product data.

B. Informational Submittals:

1. Test And Evaluation Reports:
 - a. Report of site tests, before Substantial Completion.
2. Qualification Statement:
 - a. Electrical Subcontractor:
 - 1) Provide Qualification documentation if requested by Architect or Owner.
 - b. Installer:

- 1) Provide Qualification documentation if requested by Architect or Owner.
- A. Closeout Submittals:
3. Include following in Operations And Maintenance Manual :
 - a. Operations and Maintenance Data:
 - 1) Provide operating and maintenance instructions for each item of equipment submitted under Product Data.
 - b. Record Documentation:
 - 1) Manufacturers documentation:
 - a) Manufacturer's literature.
 - b) Include copy of approved shop drawings.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
1. NEC and local ordinances and regulations shall govern unless more stringent requirements are specified.
 2. Material and equipment provided shall meet standards of NEMA or UL and bear their label wherever standards have been established and label service is available.
- B. Qualifications
1. Electrical Subcontractor:
 - a. Company specializing in performing work of this section.
 - 1) Minimum five (5) years experience in electrical installations.
 - 2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
 - b. Upon request, submit documentation.
 2. Installer:
 - a. Licensed for area of Project.
 - b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
 - c. Upon request, submit documentation.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Performance:
1. Design Criteria:
 - a. Materials and equipment provided under following Sections shall be by same Manufacturer:
 - 1) Section 26 2417: Panelboards.
 - 2) Section 26 2816: Enclosed Switches And Circuit Breakers.

PART 3 - EXECUTION

3.1 INSTALLERS

- A. Acceptable Installers:
1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

A. Verification Of Conditions:

1. Confirm dimensions, ratings, and specifications of equipment to be installed and coordinate these with site dimensions and with other Sections.

3.3 INSTALLATION

A. General:

1. Locations of electrical equipment shown on Drawings are approximate only. Field verify actual locations for proper installation.
2. Coordinate electrical equipment locations and conduit runs with those providing equipment to be served before installation or rough in.
 - a. Notify Architect of conflicts before beginning work.
 - b. Coordinate locations of power and lighting outlets in mechanical rooms and other areas with mechanical equipment, piping, ductwork, cabinets, etc, so they will be readily accessible and functional.
3. Work related to other trades which is required under this Division, such as cutting and patching, trenching, and backfilling, shall be performed according to standards specified in applicable Sections.

- B. Install Penetration Firestop System appropriate for penetration at electrical system penetrations through walls, ceilings, and top plates of walls.

3.4 FIELD QUALITY CONTROL

A. Field Tests:

1. Test systems and demonstrate equipment as working and operating properly. Notify Architect before test. Rectify defects at no additional cost to Owner.

3.5 CLOSEOUT ACTIVITIES

A. Training:

1. Provide competent instructor for three (3) days to train Owner's maintenance personnel in operation and maintenance of electrical equipment and systems. Factory representatives shall assist this instruction as necessary. Schedule instruction period at time of final inspection.

END OF SECTION

SECTION 26 0503.01

ELECTRICAL UTILITY SERVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install service as described in Contract Documents and as required by local serving agency.
 - 2. Complete cost of service.
- B. Related Requirements:
 - 1. Section 26 0501: Common Electrical Requirements.
 - 2. Local utility shall furnish and install secondary underground service to CT cabinet. Contractor shall provide CT cabinet.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Interface With Other Work: Coordinate with serving agency on all items, especially service entrance fittings, meter sockets, and current transformer (C/T) boxes where required.

END OF SECTION

SECTION 26 0519

LINE-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Quality of conductors used on Project except as excluded below.
- B. Related Requirements:
 - 1. Section 26 0501: Common Electrical Requirements.

1.2 REFERENCES

- A. Definitions:
 - 1. Line Voltage: Over 70 Volts.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Line Voltage Conductors:
 - 1. Copper with AWG sizes as shown:
 - a. Minimum size shall be No. 12 except where specified otherwise.
 - b. Conductor size No. 8 and larger shall be stranded.
 - 2. Insulation:
 - a. Standard Conductor Size No. 10 And Smaller: 600V type THWN or XHHW (75 deg C).
 - b. Standard Conductor Size No. 8 And Larger: 600V Type THW, THWN, or XHHW (75 deg C).
 - c. Higher temperature insulation as required by NEC or local codes.
 - 3. Colors:
 - a. 240 / 120 V System:
 - 1) Black: Phase A.
 - 2) Red: Phase B.
 - 3) Green: Ground.
 - 4) White: Neutral.
 - b. Conductors size No. 10 and smaller shall be colored full length. Tagging or other methods for coding of conductors size No. 10 and smaller not allowed.
 - c. For feeder conductors larger than No. 10 at pull boxes, gutters, and panels, use painted or taped band or color tag color-coded as specified above.
- B. Line Voltage Cables:
 - 1. Non-Metallic Sheathed Cable (NM) **shall not be used**. Metal Clad Cable (MC) may be used as restricted below:
 - a. Copper conductors
 - b. Sizes #12 through #8
 - c. Use only in indoor dry locations where:
 - 1) Concealed and not subject to damage.
 - 2) Not in contact with earth.

- d. Not in concrete
 - e. Not in truck bays
- C. Cord Sets For Ranges: Three pole, 4 wire grounding, 125/250V, NEMA 14-50P plug, 48 inch cord length minimum.
- D. Standard Connectors:
 - 1. Conductors No. 8 And Smaller: Steel spring wire connectors.
 - 2. Conductors Larger Than No. 8: Pressure type terminal lugs.
 - 3. Connections Outside Building: Watertight steel spring wire connections with waterproof, non-hardening sealant.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Conductors and cables shall be continuous from outlet to outlet.
 - 2. Do not use direct burial cable.
- B. Line Voltage Conductors:
 - 1. Install conductors in raceway where indicated on Drawings. Run conductors of different voltage systems in separate conduits.
 - 2. Route circuits at own discretion, however, circuiting shall be as shown in Panel Schedules.
Neutrals:
 - a. Run separate neutrals for each circuit.
 - 3. Pulling Conductors:
 - a. Do not pull conductors into conduit until raceway system is complete and cabinets and outlet boxes are free of foreign matter and moisture.
 - b. Do not use heavy mechanical means for pulling conductors.
 - c. Use only listed wire pulling lubricants.
- C. Line Voltage Cables:
 - 1. Route circuits at own discretion, however, circuiting and numbering shall be as shown in Panel Schedules.
 - 2. Support cables using approved staples, cable ties, straps, hangers, or similar fittings, spaced as required.
 - 3. Where installing in framing, do not bore holes in joists or beams outside center 1/3 of member depth or within 24 inches of bearing points. Do not bore holes in vertical framing members outside center 1/3 of member width. Holes shall be one inch diameter maximum.
 - 4. Conceal cables within ceilings and walls of finished areas.
 - 5. Keep cables 6 inches minimum from hot water pipes.
 - 6. Do not support cables from mechanical ducts or duct supports.
 - 7. Prohibited procedures:
 - a. Boring holes for installation of cables in vertical truss members.
 - b. Notching of structural members for installation of cables.

END OF SECTION

SECTION 26 0526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install grounding for electrical installation as described in Contract Documents except as excluded below.
- B. Related Requirements:
 - 1. Section 26 0501: Common Electrical Requirements.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Manufacturers:
 - 1. Type One Acceptable Products:
 - a. 'Cadweld' by Erico International, Solon, OH www.erico.com.
 - b. 'ThermOweld' by Continental Industries, Tulsa, NE www.conind.com.
- B. Performance:
 - 1. Design Criteria:
 - a. Size materials as shown on Drawings and in accordance with applicable codes.
 - b. Bonding System Workmanship:
 - 1) The ground/earthing system shall be designed for high reliability and shall meet following criteria:
 - a) Local electrical codes shall be adhered to.
 - b) All grounding/earthing conductors shall be copper.
 - c) Regulatory Agency Sustainability Approvals requirements are required.
 - c. Rack and Cabinet Grounding/Earthing:
 - 1) Equipment and racks shall be bonded in accordance with methods prescribed in ANSI/TIA-942.
- C. Materials:
 - 1. Grounding And Bonding Jumper Conductors: Bare copper or with green insulation.
 - 2. Make grounding conductor connections to ground rods and water pipes using approved bolted clamps listed for such use.
 - 3. Service Grounding Connections And Cable Splices: Make by exothermic process.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Grounding conductors and bonding jumper conductors shall be continuous from terminal to terminal without splice. Provide grounding for following.
 - 1. Electrical service, its equipment and enclosures.

2. Conduits and other conductor enclosures.
 3. Neutral or identified conductor of interior wiring system.
 4. Main panelboard, power and lighting panelboards.
 5. Non-current-carrying metal parts of fixed equipment such as motors, starter and controller cabinets, instrument cases, and lighting fixtures.
- B. Grounding connection to main water supply shall be accessible for inspection and made within **6 inches** of point of entrance of water line to building. Provide bonding jumpers across water meter and valves to assure electrical continuity.
- C. Ground identified grounded (neutral) conductor of electrical system on supply side of main service disconnect.
- D. Pull grounding conductors in non-metallic raceways, in flexible steel conduit exceeding **72 inches** in length, and in flexible conduit connecting to mechanical equipment.
- E. Connect equipment grounds to building system ground.
1. Use same size equipment grounding conductors as Phased conductors up through #10 AWG.
 2. Use NEC Table 250-95 for others unless noted otherwise in Drawings.
- F. Run separate insulated grounding cable from each equipment cabinet to electrical panel. Do not use intermediate connections or splices. Affix directly to cabinet.
- G. On motors, connect ground conductors to conduit with approved grounding bushing and to metal frame with bolted solderless lug.

END OF SECTION

SECTION 26 0533

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Quality of material and installation procedures for raceway, boxes, and fittings used on Project but furnished under other Divisions.
 - 2. Furnish and install raceway, conduit, and boxes used on Project not specified to be installed under other Divisions.
- B. Related Requirements:
 - 1. Section 26 0501: 'General Electrical Requirements'.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Cooper B-Line, Highland, IL www.b-line.com.
 - b. Hubbell Incorporated, Milford, CT www.hubbell-wiring.com or Hubbell Canada Inc, Pickering, ON (905) 839-4332.
 - c. Square D, Palatine, IL www.squared.com.
 - d. Thomas & Betts, Memphis, TN www.tnb.com or Thomas & Betts Ltd, Iberville, PQ (450) 347-5318.
- B. Materials:
 - 1. Raceway And Conduit:
 - a. Sizes:
 - 1) **3/4 inch** for exterior use, unless indicated otherwise.
 - 2) **1/2 inch** for interior use, unless indicated otherwise.
 - b. Types: Usage of each type is restricted as specified below by product.
 - 1) Galvanized rigid steel or galvanized intermediate metal conduit (IMC) is allowed for use in all areas. Where in contact with earth or concrete, wrap buried galvanized rigid steel and galvanized IMC conduit and fittings completely with vinyl tape.
 - 2) Galvanized Electrical Metallic Tubing (EMT), Flexible Steel Conduit
 - a) Allowed for use only in indoor dry locations where it is:
 - (1) Not subject to damage.
 - (2) Not in contact with earth.
 - (3) Not in concrete.
 - b) For metal conduit systems, flexible steel conduit is required for final connections to indoor mechanical equipment.
 - 3) Schedule 40 Polyvinyl Chloride (PVC) Conduit:
 - a) Allowed for use only underground or below concrete with galvanized rigid steel or IMC elbows and risers.
 - 4) Listed, Liquid-Tight Flexible Metal Conduit:
 - a) Use in outdoor final connections to mechanical equipment, length not to exceed **36 inches**.

- 5) Pre-wired **3/8 Inch** Flexible Fixture Whips: Allowed only for connection to recessed lighting fixtures, lengths not to exceed **72 inches**.
- c. Prohibited Raceway Materials:
 - 1) Aluminum conduit.
 - 2) Armored cable type AC (BX) cable.
2. Raceway And Conduit Fittings:
 - a. Rigid Steel Conduit And IMC: Threaded and designed for conduit use.
 - b. EMT:
 - 1) Compression type.
 - c. PVC Conduit:
 - 1) PVC type. Use PVC adapters at all boxes.
 - 2) PVC components, (conduit, fittings, cement) shall be from same Manufacturer.
 - d. Flexible Steel Conduit: Screw-in type.
 - e. Liquid-tight Flexible Metal Conduit: Sealite type.
 - f. Expansion fittings shall be equal to OZ Type AX sized to raceway and including bonding jumper.
 - g. Prohibited Fitting Materials:
 - 1) Crimp-on, tap-on, indenter type fittings.
 - 2) Cast set-screw fittings for EMT.
 - 3) Spray (aerosol) PVC cement.
3. Outlet Boxes:
 - a. Galvanized steel of proper size and shape are acceptable for all systems. Where metal boxes are used, provide following:
 - 1) Provide metal supports and other accessories for installation of each box.
 - 2) Equip ceiling and bracket fixture boxes with fixture studs where required.
 - 3) Equip outlets in plastered, paneled, and furred finishes with plaster rings and extensions to bring box flush with finish surface.
 - b. Non-metallic boxes may be used only for control voltage wiring systems.
 - c. Telephone / data outlet boxes shall be single device outlet boxes.
 - d. HVAC Instrumentation And Control:
 - 1) Junction boxes in mechanical equipment areas shall be **4 inches** square.
 - 2) Boxes for remote temperature sensor devices shall be recessed single device.
 - 3) Boxes for thermostats shall be **4 inches** square with raised single device cover.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 1. Confirm dimensions, ratings, and specifications of materials to be installed and coordinate these with site dimensions and with other Sections.

3.2 INSTALLATION

- A. Interface With Other Work:
 1. Coordinate with Divisions 22 and 23 for installation of raceway for control of plumbing and HVAC equipment.
 2. Coordinate with others for installation of raceway for sound system.
 3. Before rough-in, verify locations of boxes with work of other trades to insure that they are properly located for purpose intended.
 - a. Coordinate location of outlet for water cooler with Division 22.
 - b. Coordinate location of outlets adjacent to or in millwork with GC before rough-in. Refer conflicts to Architect and locate outlet under his direction.
 4. Install pull wires in raceways installed under this Section where conductors or cables are to be installed under other Divisions.

B. Conduit And Raceway:

1. Conceal raceways within ceilings, walls, and floors, except at Contractor's option, conduit may be exposed on walls or ceilings of mechanical equipment areas and above acoustical panel suspension ceiling systems. Install exposed raceway runs parallel to or at right angles to building structure lines.
2. Keep raceway runs **6 inches** minimum from hot water pipes.
3. Make no more than four quarter bends, 360 degrees total, in any conduit run between outlet and outlet, fitting and fitting, or outlet and fitting.
 - a. Make bends and offsets so conduit is not injured and internal diameter of conduit is not effectively reduced.
 - b. Radius of curve shall be at least minimum indicated by NEC.
4. Cut conduit smooth and square with run and ream to remove rough edges. Cap raceway ends during construction. Clean or replace raceway in which water or foreign matter have accumulated.
5. Bend PVC conduit by hot box bender and, for PVC **2 inches** in diameter and larger, expanding plugs. Apply PVC adhesive only by brush.
6. Installation In Framing:
 - a. Do not bore holes in joists or beams outside center 1/3 of member depth or within **24 inches** of bearing points. Do not bore holes in vertical framing members outside center 1/3 of member width.
 - b. Holes shall be **one inch** diameter maximum.
7. Underground Raceway And Conduit:
 - a. Bury underground raceway installed outside building **24 inches** deep minimum.
 - b. Bury underground conduit in planting areas **18 inches** deep minimum. It is permissible to install conduit directly below concrete sidewalks, however, conduit must be buried **18 inches** deep at point of exit from planting areas.
8. Conduit And Raceway Support:
 - a. Securely support raceway with approved straps, clamps, or hangers, spaced as required.
 - b. Do not support from mechanical ducts or duct supports without Architect's written approval. Securely mount raceway supports, boxes, and cabinets in an approved manner by:
 - 1) Expansion shields in concrete or solid masonry.
 - 2) Toggle bolts on hollow masonry units.
 - 3) Wood screws on wood.
 - 4) Metal screws on metal.
9. Prohibited Procedures:
 - a. Use of wooden plugs inserted in concrete or masonry units for mounting raceway, supports, boxes, cabinets, or other equipment.
 - b. Installation of raceway that has been crushed or deformed.
 - c. Use of torches for bending PVC.
 - d. Spray applied PVC cement.
 - e. Boring holes in truss members.
 - f. Notching of structural members.
 - g. Supporting raceway from ceiling system support wires.
 - h. Nail drive straps or tie wire for supporting raceway.

C. Boxes:

1. Boxes shall be accessible and installed with approved cover.
2. Do not locate device boxes that are on opposite sides of framed walls in the same stud space. In other wall construction, do not install boxes back to back.
3. Locate boxes so pipes, ducts, or other items do not obstruct outlets.
4. Install outlets flush with finished surface and level and plumb.
5. Support switch boxes larger than two-gang with side brackets and steel bar hangers in framed walls.
6. At time of substantial completion, install blank plates on uncovered outlet boxes that are for future use.

END OF SECTION

SECTION 26 2417

CIRCUIT-BREAKER PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install circuit-breaker panelboards as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 26 0501: Common Electrical Requirements.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Cutler-Hammer Inc, Pittsburgh, PA www.eatonelectric.com.
 - b. General Electric Industrial Systems, Charlotte, NC www.geindustrial.com.
 - c. Siemens Energy & Automation, Alphrata, GA www.sea.siemens.com.
 - d. Square D Co, Palatine, IL www.us.squared.com.
- B. Performance:
 - 1. Capacities and ratings as scheduled.
- C. Material:
 - 1. Circuit-breaker type.
 - 2. Galvanized steel cabinets
 - 3. Bussing and lugs arranged as required.
 - 4. Multi-pole circuit-breakers shall be common trip.
 - 5. Circuit-breakers shall be molded case thermal magnetic type with inverse time characteristics.
 - 6. Lighting And Appliance Panelboards:
 - a. Plug-on or bolt-on breakers. Multi-pole breakers shall be common trip.
 - b. Factory installed or provided circuit number identification for each breaker and space.
 - c. Cabinets shall be locking type with no exposed latches or screws when door is closed. Key panels alike and provide minimum of three keys.
 - d. Minimum dimensions of 20 inches wide by 5-3/4 inches deep.
 - e. Approved Products
 - 1) Type PRL1a by Cutler-Hammer.
 - 2) Type AL or AQ by General Electric.
 - 3) Type P1 by Siemens.
 - 4) Type NQOD by Square D.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Label panelboards with **1/16 inch** thick laminated plastic composition material with contrasting color core. Engraved letters shall be **1/4 inch** high.
- B. Provide typewritten circuit schedules in lighting and distribution panelboards to identify panelboard and load served by each branch breaker.
- C. Arrange conductors neatly within panelboards.

3.2 PROTECTION

- A. Protect panelboards and interior components from paint, gypsum board compound, dirt, dust, and other foreign matter during construction.

END OF SECTION

SECTION 26 2726

WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install wiring devices complete with plates as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 26 0501: 'Common Electrical Requirements'.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Cooper Wiring Devices
 - b. Hubbell
 - c. Leviton
 - d. Pass & Seymour
 - 2. Product Options:
 - a. Devices of single type shall be from same Manufacturer.
 - b. Verify device and plate color with architect and owner prior to ordering.
- B. Devices:
 - 1. Switches: 20 AMP, single pole, specification grade.
 - 2. Receptacles: 20 AMP, specification grade
 - 3. Range Receptacle: Three pole, four wire grounding, 125 / 250 V, NEMA 14-50R, 50 AMP complete with plate.
 - 4. Ground Fault Circuit Interrupter (GFCI): 15 AMP, specification grade.
- C. Plates:
 - 1. Standard Cover Plates:
 - a. Office / Occupied Areas:
 - 1) Nylon or high impact resistant thermoplastic.
 - 2) Color shall match wiring device.
 - b. All Other: Steel.
 - c. Ganged switches shall have gang plates.
 - d. Approved Manufacturers.
 - 1) Cooper.
 - 2) Hubbell.
 - 3) Leviton.
 - 4) Pass & Seymour.

2.2 INSTALLATION

- A. Install devices flush with walls, straight, and solid to box.

END OF SECTION

SECTION 26 2816

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install disconnects as described in Contract Documents, except those provided integral with equipment.
- B. Related Requirements:
 - 1. Section 26 0501: Common Electrical Requirements.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

- A. Manufacturers:
 - 1. Approved Manufacturers.
 - a. Disconnects: Same as Manufacturer of Project's panelboards.
 - b. Fuses.
 - 1) Cooper Bussmann, Ellisville, IL www.cooperbussmann.com.
 - 2) Edison Fuse, Ellisville, IL (314) 391-3443.
 - 3) Ferraz Shawmut, Newburyport, MA www.ferrazshawmut.com.
 - 4) Littelfuse Inc, Des Plaines, IL www.littelfuse.com.
- B. Disconnects:
 - 1. Heavy-duty quick-make, quick-break type, non-fused unless indicated otherwise.
 - 2. Provide interlock to prevent opening of door when switch is in ON position.
 - 3. Provide means to lock switch in OFF position with padlock.
 - 4. Disconnects for motor circuits shall be horsepower rated.
 - 5. Enclosures:
 - a. Interior: NEMA Type 1.
 - b. Exterior: NEMA Type 3R.
 - 6. Fuses:
 - a. Fuse fused disconnects with dual-element time delay fuses and equip with rejection type fuse holders.
 - b. Fuses on Project shall be from single manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Label disconnects to indicate equipment served, such as Heat Pump HP-1. Use **1/16 inch** thick laminated plastic composition material with contrasting color core. Engraved letters shall be **1/4 inch** high. Attach labels with screws.

END OF SECTION

SECTION 26 2900

GENERATOR

DIESEL-ENGINE-DRIVEN GENERATOR SETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Diesel engine.
2. Diesel fuel-oil system.
3. Control and monitoring.
4. Generator overcurrent and fault protection.
5. Generator, exciter, and voltage regulator.
6. Outdoor engine generator enclosure
7. Vibration isolation devices

B. Related Requirements:

1. Section 263600 "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine generators.

1.2 DEFINITIONS

A. EPS: Emergency power supply.

B. EPSS: Emergency power supply system.

C. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
2. Include thermal damage curve for generator.
3. Include time-current characteristic curves for generator protective device.

4. Include fuel consumption in **gallons per hour (liters per hour)** at 0.8 power factor at 0.5, 0.75, and 1.0 times generator capacity.
5. Include generator efficiency at 0.8 power factor at 0.5, 0.75, and 1.0 times generator capacity.
6. Include airflow requirements for cooling and combustion air in **cubic feet per minute (cubic meters per minute)** at 0.8 power factor, Provide Drawings indicating requirements and limitations for location of air intake and exhausts.
7. Include generator characteristics, including, but not limited to, kilowatt rating, efficiency, reactances, and short-circuit current capability.

B. Shop Drawings:

1. Dimensioned Outline Drawings of Equipment Unit: With engine and generator mounted on rails, identify center of gravity and total weight for provided components; fuel tank, enclosure, silencer, base tank, each piece of equipment not integral to the engine generator.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Identify fluid drain ports and clearance requirements for proper fluid drain.
4. Design calculations for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
5. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include base weights.
6. Include diagrams for power, signal, and control wiring. Complete schematic, wiring, and interconnection diagrams indicating terminal markings for engine generators and functional relationship between all electrical components.
7. Rigging Information: Indicate location of each lifting attachment, generator-set center of gravity, and total package weight in submittal drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Seismic Qualification Data: Certificates, for engine generator, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

B. Source Quality-Control Reports: Including, but not limited to, the following:

1. Certified summary of prototype-unit test report. Perform tests at rated load and power factor. Provide the following test results:
 - a. Maximum Power Level
 - b. Maximum Motor Starting (sKVA)
 - c. Structural Soundness
 - d. Torsional Analysis
 - e. Transient Response
 - f. Alternator Temperature Rise
 - g. Engine Cooling Requirements (unit mounted radiator)
 - h. Harmonic Analysis (per IEEE-115 and ANSI-100)

- i. Voltage Regulation
 - j. Endurance Testing
 - 2. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.
 - 3. Report of factory test on units to be shipped for this Project, indicating evidence of compliance with specified requirements.
 - 4. Report of sound generation.
 - 5. Report of exhaust emissions indicating compliance with applicable regulations.
 - 6. Certified Torsional Vibration Compatibility: Comply with NFPA 110.
- C. Field quality-control reports. Field start up report and unit in-service documentation, including load bank test results if applicable.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals. Include manufacturer's recommended maintenance and periodic testing plan in accordance with NFPA 110, Chapter 8.
- B. Furnish extra materials required by local Authority Having Jurisdiction (AHJ) and defined in project documents that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.6 QUALITY ASSURANCE

- A. The generator set covered by these specifications shall be designed, tested, rated, assembled and installed in accordance with all applicable standards below:
 - 1. CSA C22.2, No. 14-M91 Industrial Control Equipment.
 - 2. CSA C22.2, No. 100 Motors and Generators
 - 3. CSA 282-15
 - 4. EN 61000-6
 - 5. EN 55011
 - 6. FCC Part 15 Subpart B
 - 7. ISO 8528
 - 8. IEC 61000
 - 9. UL 508
 - 10. UL 2200
 - 11. UL 142
 - 12. UL 6200
 - 13. Designed to allow for installed compliance to NFPA 37, NFPA 70, NFPA 99 and NFPA 110
- B. Manufacturer Qualifications:
 - 1. Current certificate holder for ISO 9001 compliance.
 - 2. The power system shall be produced by a manufacturer who has produced this type of equipment for a period of at least 25 years and who maintains a service organization of factory-authorized generator technicians available twenty-four hours a day throughout the year.

3. Manufacturing and assembly of products must be done in the United States using domestically sourced materials to the extent practical.

- C. Installer Qualifications: An authorized representative who is trained and certified by the manufacturer on stationary power systems.

1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.
 1. Warranty: 5 Year Comprehensive from date of Substantial Completion.
 2. A Comprehensive Warranty is defined as the manufacturer covering replacement parts, labor, and limited technician travel costs for covered warranty repairs during the listed warranty period. A Limited warranty is defined as the manufacturer covering replacement parts, labor, and limited technician travel costs for the first 2 years and then replacement parts for the remainder of the listed warranty period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Generac Power Systems, Inc.; 100 kW, 6.7L with a A0100044N21 - 100kW alternator. The Single Phase generator shall be rated for 100 kW at 240 volts and 60 Hz, at 0.8 power factor lagging while operating at a maximum ambient temperature of 110 Fahrenheit and maximum altitude of 7500 feet above sea level without reduction in electrical output capacity. Comparable products by one of the following will be considered:
 1. Generac, Inc.
 2. Caterpillar, Inc.
 3. Cummins Power Generation.
- B. Source Limitations: Obtain packaged engine generators and auxiliary components from single source from single manufacturer. "Source Limitations: Obtain packaged engine generators and auxiliary components from single supplier. The equipment supplied and installed shall meet the requirements of NEC and all applicable local codes and regulations. All equipment shall be new, of current production. There shall be one source responsibility for warranty; parts and service through a local representative with factory certified service personnel.
- C. Requests for substitutions shall be made a minimum of ten (10) days prior to bid date. Manufacturers catalog data and a completed generator sizing model using the proposed manufacturer's generator sizing software shall accompany each request and authorized acceptance shall be addenda only. Should any substitutions be made, the contractor shall bear responsibility for the installation, coordination and operation of the system as well as any engineering and redesign costs, which may result from such substitutions.

2.2 PERFORMANCE REQUIREMENTS

A. NFPA Compliance:

1. Comply with NFPA 37.
2. Comply with NFPA 70.
3. Comply with NFPA 99.
4. Comply with NFPA 110 requirements for Level 1 EPSS.

B. UL Compliance: Engine generator assembly and factory enclosure (if provided) shall be UL 2200 listed.

C. Engine Exhaust Emissions: Comply with applicable US EPA, State and Local Government requirements. Diesel Stationary Emergency: Engines shall be certified by the manufacturer to comply with 40 CFR Part 60 Subpart IIII.

2.3 ENGINE GENERATOR ASSEMBLY DESCRIPTION

A. Factory-assembled and -tested, water-cooled engine, with brushless generator and accessories.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

C. Power Rating: Standby.

D. Service Load: The generator set shall be a Generac model 100 kW, 6.7L with a A0100044N21 - 100kW alternator. It shall provide 100 kW and 100 kVA while operating at the maximum ambient operating temperature and elevation specified in the project documents.

E. Power Factor: 0.8 lagging.

F. Frequency: 60 Hz.

G. Voltage: 240 Volts ac.

H. Phase: Single Phase, Three Wire.

I. Induction Method: Turbocharged.

J. Governor: Adjustable isochronous, with speed sensing.

K. Mounting Frame: Structural steel framework to maintain alignment of mounted components without depending on concrete foundation. Provide lifting attachments sized and spaced to prevent deflection of base during lifting and moving.

L. Nameplates: For each major system component to identify manufacturer's name, model and serial number of component.

M. Engine Generator Performance:

1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.

2. Transient Voltage Performance: Not more than 7.29 percent variation for 50 percent step-load increase or decrease at unity power factor. Voltage shall recover and remain within the steady-state operating band within three seconds.
3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
5. Transient Frequency Performance: Less than 2.5 Hertz variation for 50 percent step-load increase or decrease at unity power factor. Frequency shall recover and remain within the steady-state operating band within five seconds.
6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined in accordance with NEMA MG 1, shall not exceed 50 percent.
7. Sustained Short-Circuit Current: For a three-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.
8. Start time to comply with NFPA system requirements.

2.4 ENGINE PERFORMANCE

- A. Fuel: ASTM D975, diesel fuel oil, Grade 2-D S15.
- B. Rated Engine Speed: 1800 rpm.
- C. Lubrication System to be engine mounted.
 1. Oil filter shall be engine-mounted replaceable cartridge type with integral bypass valve, in accordance with manufacturer recommendations.
 2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
 3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.
- D. Jacket Coolant Heater: Jacket water heater shall be sized per NFPA110 and UL listed to ensure that genset will start within the specified time period and ambient conditions.
- E. Integral Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine generator set mounting frame and integral engine-driven coolant pump.
 1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
 2. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gauge glass and petcock.
 3. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
 4. Maximum Ambient Operating Temperature on Radiator: 122 degrees F (50 degrees C).
 5. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, UV-, and abrasion-resistant fabric.

- a. Rating: **50-psig (345-kPa)** maximum working pressure with coolant at **180 deg F (82 deg C)**, and noncollapsible under vacuum.
- b. Meets SAE 100R1A Type S, EN853 1SN, ISO 1436-1 Type 1SN
- c. a Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.

F. Muffler/Silencer:

- 1. Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

G. Air-Intake Filter: Heavy duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

H. Starting System: 12 or 24-V electric, with negative ground.

- 1. Cranking Cycle: As required by NFPA 110 for system level specified.
- 2. Battery: Lead acid, with capacity within ambient temperature range specified in "Performance Requirements" Article to provide specified cranking cycle as required by NFPA 110 for system level specified.
- 3. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35 minimum continuous rating.
- 4. Battery Charger: Current-limiting, automatic-equalizing, and float-charging type designed for lead-acid batteries. Unit shall comply with UL 1236 and NFPA 110 Section 5.6.4.6 for Level 1 systems.:

2.5 FUEL SYSTEM – DIESEL

A. Comply with NFPA 37.

B. Piping: Fuel-oil piping shall be Schedule 40 black steel, complying with requirements in Section 231113 "Facility Fuel-Oil Piping." Cast iron, aluminum, copper, and galvanized steel shall not be used in the fuel-oil system.

C. Main Fuel Pump: Mounted on engine to provide primary fuel flow under starting and load conditions.

D. Fuel Filtering: Remove water and contaminants larger than 2 microns.

E. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.

F. Subbase-Mounted, Double-Wall, Fuel-Oil Tank: Factory installed and piped, complying with UL 142 fuel-oil tank. Features include the following:

- 1. Tank level indicator.
- 2. Fuel-Tank Capacity: Sized for 48 running hours at 100% of rated generator load between fuel refills.
- 3. Leak detection in interstitial space.
- 4. Vandal-resistant fill cap.
- 5. Containment Provisions: Comply with requirements of authorities having jurisdiction. Secondary containment basin, sized at a minimum of 110% of the tank capacity to prevent escape of fuel into the environment in the event of a primary tank rupture.
- 6. Normal and emergency vents on the main tank and secondary containment space, sized according to UL 142.

2.6 CONTROL AND MONITORING

- A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of engine generator. When mode-selector switch is switched to the on position, engine generator starts. The off position of same switch initiates engine generator shutdown. When engine generator is running, specified system or equipment failures or derangements automatically shut down engine generator and initiate alarms.
- B. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts engine generator. The off position of same switch initiates engine generator shutdown. When engine generator is running, specified system or equipment failures or derangements automatically shut down engine generator and initiate alarms.
- C. Provide minimum run time control set for 15 minutes with override only by operation of a remote emergency-stop switch.
- D. Control panel must comply with UL 6200. The controller shall meet ASTM B117 (salt spray test).
- E. Connection to Building Management: Provide connections for data transmission of indications to remote data terminals via Modbus.
- F. Environmentally Hardened Design: Open circuit boards, edge cards, and PC ribbon cable connections are unacceptable.
- G. PCB Construction: Circuit boards with surface-mounted components to provide vibration durability. Circuit boards utilizing large capacitors or heat sinks must utilize encapsulation methods to securely support these components.
- H. Configuration:
 - 1. Operating and safety indications, protective devices, basic system controls, and engine gauges shall be grouped in a common control and monitoring panel mounted on the engine generator. Mounting method shall isolate the control panel from engine generator vibration. Panel powered from the engine generator battery.
- I. Control and Monitoring Panel:
 - 1. Digital engine generator controller with integrated touch screen, controls, and microprocessor, capable of local and remote control, monitoring, and programming, with battery backup.
 - 2. Instruments: Located on the control and monitoring panel and viewable during operation.
 - a. Engine lubricating-oil pressure gauge.
 - b. Engine-coolant temperature gauge.
 - c. DC voltmeter (alternator battery charging).
 - d. Running-time meter.
 - e. AC voltmeter, for each phase.
 - f. AC ammeter, for each phase.
 - g. AC frequency meter.
 - h. Generator-voltage adjusting feature.

3. Controls and Protective Devices: Controls, shutdown devices, and common alarm indication, including the following:
 - a. Cranking control equipment.
 - b. Run-Off-Auto switch.
 - c. Control switch not in automatic position alarm.
 - d. Overcrank alarm.
 - e. Overcrank shutdown device.
 - f. Low-water temperature alarm.
 - g. High engine temperature pre-alarm.
 - h. High engine temperature.
 - i. High engine temperature shutdown device.
 - j. Overspeed alarm.
 - k. Overspeed shutdown device.
 - l. Low fuel main tank.
 - 1) Low-fuel-level alarm shall be initiated when the level falls below that required for operation for duration required for the indicated EPSS class.
 - m. Coolant low-level alarm.
 - n. Coolant low-level shutdown device.
 - o. Coolant high-temperature prealarm.
 - p. Coolant high-temperature alarm.
 - q. Coolant low-temperature alarm.
 - r. Coolant high-temperature shutdown device.
 - s. EPS load indicator.
 - t. Battery high-voltage alarm.
 - u. Low cranking voltage alarm.
 - v. Battery-charger malfunction alarm.
 - w. Battery low-voltage alarm.
 - x. Lamp test.
 - y. Contacts for local and remote common alarm.
 - z. Remote manual stop shutdown device.
 - aa. Total engine run hours, non-resettable.
 - bb. Engine generator metering, including voltage, current, hertz, kilowatt, kilovolt ampere, and power factor.
- J. Engine Generator Metering: Comply with [Section 260913 "Electrical Power Monitoring and Control."]
[Section 262713 "Electricity Metering."]
[Section 260913 "Electrical Power Monitoring and Control" and
Section 262713 "Electricity Metering."]
- K. External Alarm & Status Relays: Provide a separate terminal block, factory wired to Form C dry contacts, for each alarm and status condition required by Building Management or other external systems as shown on electrical drawings.
- L. Common Remote Panel with Common Audible Alarm: Include necessary contacts and terminals in control and monitoring panel. Remote panel shall be powered from the engine generator battery.
- M. Remote Alarm Annunciator: An LED indicator light labeled with proper alarm conditions shall identify each alarm event, and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced,

clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.

1. Overcrank alarm.
2. Low water-temperature alarm.
3. High engine temperature pre-alarm.
4. High engine temperature alarm.
5. Low lube oil pressure alarm.
6. Overspeed alarm.
7. Low fuel main tank alarm.
8. Low coolant level alarm.
9. Low cranking voltage alarm.
10. Contacts for local and remote common alarm.
11. Audible-alarm silencing switch.
12. Air shutdown damper when used.
13. Run-Off-Auto switch.
14. Control switch not in automatic position alarm.
15. Fuel tank derangement alarm.
16. Fuel tank high-level shutdown of fuel supply alarm.
17. Lamp test.
18. Low-cranking voltage alarm.
19. Generator overcurrent-protective-device not-closed alarm.

N. Remote Emergency-Stop Switch: Provide remote emergency stop switch in quantity and style as shown on electrical drawings. Electrical contractor to coordinate exact location with engineer and local AHJ.

O. Data Logging:

1. Event Logging – the controller keeps a record of up to 8,000 events with date and time locally for warning and shutdown faults. This event log can be downloaded onto a USB storage device or onto a PC through the service program.
2. Event Snapshot – the control system shall capture 15 seconds of critical data around the time a fault or warning. This data shall be viewable on the controller and downloadable.
3. Data Logging – the controller shall allow customized parameters to be logged based on a start trigger from the controller interface.
 - a. The parameters are selectable from all monitored parameters.
 - b. The sample period shall be configurable from 1 second to 1 day.
 - c. The collected data shall be stored on a USB storage device plugged into the control panel.

2.7 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Overcurrent protective devices shall be coordinated to optimize selective tripping when a short circuit occurs.

1. Overcurrent protective devices for the entire EPSS shall be coordinated to optimize selective tripping when a short circuit occurs. Coordination of protective devices shall consider both utility and EPSS as the voltage source.
2. Overcurrent protective devices for the EPSS shall be accessible only to authorized personnel.

B. Generator Overcurrent Protective Device:

1. Unit mounted circuit breakers. Rating, ampacity, accessories, as shown on drawings or as listed below:
2. Molded-case type disconnect switch; 100 percent rated:
 - a. Trip Rating: Matched to generator output rating.
 - b. Shunt Trip: Connected to trip switch when signaled by generator protector or by other protective devices.

C. Generator Controller Integrated Alternator Protective Functions:

1. Short-time I^2t function: Generator controller-based function shall continuously monitor current level in each phase of alternator output, integrate alternator heating effect over time, and predict when thermal damage of alternator will occur. As overcurrent heating effect on the alternator approaches the thermal damage point of the unit, protector switches the excitation system off, opens the generator disconnect device, and shuts down the engine generator. When signaled by generator protector or other engine generator protective devices, a shunt-trip device in the generator disconnect switch shall open the switch to disconnect the generator from load circuits.
2. Long-time function: Initiates a generator overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other engine generator malfunction alarms. Contacts shall be available for load shed functions.
3. Short-circuit fault clearing: Under single- or three-phase fault conditions, regulates generator to 300 percent of rated full-load current for up to 10 seconds.
4. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot.

2.8 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

- A. Comply with NEMA MG 1.
- B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.
- C. Electrical Insulation: Class H.
- D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.
- E. Range: Provide range of output voltage by adjusting the excitation level.
- F. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity. Stator shall be skewed construction to minimize harmonic voltage distortion.
- G. Enclosure: Drip proof.
- H. Instrument Transformers: Mounted within generator enclosure.

I. Voltage Regulator:

1. Voltage Regulator: Solid-state type, separate from exciter. The digital voltage regulator shall be microprocessor based with fully programmable operating and protection characteristics. The regulator shall maintain steady-state generator output voltage within +/- 0.25% for any constant load between no load and full load. The regulator shall be capable of sensing true RMS. The regulator shall provide an adjustable Volts/Hz slope regulation characteristic in order to optimize voltage and frequency response for site conditions.
2. Alternator Excitation: Permanent Magnet Generator (PMG) shall provide excitation power for optimum motor starting and short circuit performance.
3. The generator must accept rated load in one-step.
4. System Transient Voltage Performance: Alternator shall be capable of supplying 71 sKVA with a voltage dip not more than 35% at 0.3 starting power factor. Sustained voltage dip data or manufacturer-published SKVA numbers based on unity PF alternator-only dynamometer testing will not be accepted.

J. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point. The strip heater shall be wired directly to the incoming power distribution panel or load center.

K. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

2.9 OUTDOOR ENGINE GENERATOR ENCLOSURE

- A. Basis of design is a weather protective enclosure which allows the generator to operate at full rated load.
- B. Generator packaged within manufacturer's weather protective, sound attenuated enclosure. Enclosure and generator set shall be UL 2200 Listed as a system.
- C. Enclosure Construction: Minimum 14 gauge construction. Roof construction shall be raised-seam, gasket-free interlocking panels. Rivets shall not be used on external painted surfaces. Design shall be rodent resistant.
- D. Doors shall be equipped with lift-off pin and sleeve type hinges to allow access to the engine, alternator, and control panel. Hinges shall be adjustable for door alignment. Hinges and all exposed fasteners shall be stainless steel. Each door shall be equipped with minimum 2-point latching mechanism and identical keys. Perimeter of all door openings shall include polyethylene gasket.
- E. Upward discharging exhaust hood for engine cooling airflow and exhaust.
- F. Engine exhaust silencer mounted within enclosure discharge hood.
- G. Enclosure Finish: Electrostatic applied powered paint, baked and finished to manufacturer's specifications. Finish system shall be subjected to the following tests:
 1. ASTM D1186 - 87; 2.5+ mil Paint Thickness
 2. ASTM D3363 - 92a; Material Hardness
 3. ASTM D522 - B; Resistance to Cracking
 4. ASTM D3359 - B; Adhesion
 5. ASTM B117 D 1654; Resistant to Salt Water Corrosion
 6. ASTM D1735 D 1654; Resistant to Humidity

- 7. ASTM 2794 93 (2004); Impact Resistance
- 8. SAE J1690 - UV Protection"

- H. Enclosure Color: Manufacturer's standard color, or custom color matched based on architect's design with color sample provided to generator manufacturer.
- I. Wind Rating: Enclosure shall be constructed to attain basic wind speed rating of 110 MPH; WIF 1.15, Exposure Category "C", Building Classification "Enclosed", Topographic Factor $K_{zt} = 1$. Wind Design Pressures: windward, 20.6 lb/ft^2 ; leeward, -12.9 lb/ft^2 ; roof, -18.0 lb/ft^2 ."
- J. Snow Load Rating: Minimum 70 pounds per square foot.
- K. Engine-Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for two hours with ambient temperature at top of range specified in system service conditions.
- L. Sound Insulation: Enclosure and air discharge hood completely lined with reflective silver mylar faced sound attenuating closed cell foam that meets UL 94 HF1 standards for flammability (FMVSS 302 test method). Roof sound insulation panels shall include additional mechanical retention.
- M. Sound Performance: The engine generator, while operating at full rated load, shall not exceed 82.30 dBA average measured at 23 ft (7 meters) from the engine generator in a free field environment.
- N. Louvers: Fixed-engine, cooling-air inlet and discharge. Stormproof and drainable louvers prevent entry of rain and snow.
- O. Convenience Outlet: Factory-wired convenience 120v duplex-outlet within enclosure, GFCI.

2.10 VIBRATION ISOLATION DEVICES

- A. Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized-steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment for units with a ratings 750kw or below.
 - 1. Material: Standard neoprene separated by steel shims.
- B. Spring Isolators: Freestanding, steel, open-spring isolators with seismic restraint for units with a rating larger than 750kw.
 - 1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to wind loads or if weight is removed; factory-drilled baseplate bonded to ~~1/4-inch-~~ (6-mm-) thick, elastomeric isolator pad attached to baseplate underside; and adjustable equipment-mounting and -leveling bolt that acts as blocking during installation.
 - 2. Outside Spring Diameter: Not less than 80 percent of compressed height of the spring at rated load.
 - 3. Minimum Additional Travel: 50 percent of required deflection at rated load.
 - 4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.

5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Minimum Deflection: 0.5.

C. Vibration isolation devices shall not be used to accommodate misalignments or to make bends.

2.11 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine generator using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with IEEE 115 and with NFPA 110, Level 1 Energy Converters.

B. Project-Specific Equipment Tests: Before shipment, factory test engine generator and other system components and accessories manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:

1. Test components and accessories furnished with installed unit that are not identical to those on tested prototype to demonstrate compatibility and reliability.
2. Test generator, exciter, and voltage regulator as a unit.
3. Full load run.
4. Maximum power.
5. Voltage regulation.
6. Transient and steady-state governing.
7. Single-step load pickup.
8. Safety shutdowns.
9. Report factory test results within 10 days of completion of test.

2.12 FINISHES

A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine generator performance.

B. Examine roughing-in for piping systems and electrical connections. Verify actual locations of connections before packaged engine generator installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service in accordance with requirements indicated:
 - 1. Notify Project Manager in advance of proposed interruption of electrical service.
 - 2. Do not proceed with interruption of electrical service without written permission.

3.3 INSTALLATION

- A. Comply with NECA 1 and NECA 404.
- B. Comply with packaged engine generator manufacturers' written installation and alignment instructions and with NFPA 110.
- C. Equipment Mounting:
 - 1. Install packaged engine generators on cast-in-place concrete equipment bases or steel dunnage as indicated on drawings.
 - 2. Coordinate size and location of mounting bases for packaged engine generators.
 - 3. Install unit with vibration isolation devices described in section 2.11.

3.4 FIELD QUALITY CONTROL

- A. Tests and Inspections: The supplier of the electric generating plant and associated items covered herein shall provide factory certified technicians to inspect the completed installation and to perform an initial startup inspection to include:
 - 1. Ensuring the engine starts (both hot and cold) within the specified time.
 - 2. Verification of engine parameters within specification.
 - 3. Verify no load frequency and voltage, adjusting if required.
 - 4. Test all automatic shutdowns of the engine-generator.
 - 5. Perform a load test of the electric plant, ensuring full load frequency and voltage are within specification by using building load.
- B. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here, including, but not limited to, single-step full-load pickup test.
- C. Battery and Charger Tests:
 - 1. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions.
 - 2. Verify that measurements are within manufacturer's specifications."
- D. System Integrity Tests: Verify proper installation, connection, and integrity of each element of engine generator system before and during system operation. Check for air, exhaust, and fluid leaks.
- E. Coordinate tests with tests for transfer switches and run them concurrently.

- F. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation for generator and associated equipment.
- G. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- H. Remove and replace malfunctioning units and retest and reinspect as specified above.
- I. Retest: Correct deficiencies identified by tests and observations, and retest until specified requirements are met.
- J. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators.

3.6 MAINTENANCE SERVICE

A. Repair Service Capabilities:

1. The generator set supplier shall maintain service parts inventory for the entire power system at a central location which is accessible to the service location 24 hours per day, 365 days per year. The manufacturer of the generator set shall maintain a central parts inventory to support the supplier, covering all the major components of the power system, including: engines, alternators, control systems, paralleling electronics, and power transfer equipment.
2. The generator set shall be serviced by a local service organization that is trained and factory certified in generator set service. The supplier shall maintain an inventory of power system replacement parts in the local service location. Service vehicles shall be stocked with critical replacement parts. The service organization shall be on call 24 hours per day, 365 days per year. The service organization shall be physically located within 50 miles of the site.
3. The manufacturer shall maintain model and serial number records of each generator set provided for at least 20 years.

- B. Preventative Maintenance Service Agreement: The supplier shall include as a line item adder in the proposal, a one-year maintenance service agreement. The maintenance shall be performed by factory authorized service technicians capable of servicing both the engine generator set(s) and the transfer switch(es). This agreement shall include semi-annual preventative maintenance visits to verify operation and/or complete the following:

1. All periodic engine maintenance as recommended by the service manual.
2. All electrical controls maintenance and calibrations as recommended by the manufacturer.
3. All auxiliary equipment as a part of the emergency systems.
4. The supplier shall guarantee emergency service.
5. All expendable maintenance items are to be included in this agreement.
6. A copy of this agreement and a schedule shall be provided in the submittal documents, detailing scope of work and preventative maintenance service visit interval.

END OF SECTION 262900

SECTION 26 2901

AUTOMATIC TRANSFER SWITCH

PART 1 GENERAL

1.1 Scope

Furnish and install automatic transfer switches (ATS) with number of poles, amperage, voltage, and withstand current ratings as shown on the plans. Each automatic transfer shall consist of an inherently double throw power transfer switch unit and a microprocessor controller, interconnected to provide complete automatic operation. All transfer switches and control panels shall be the product of the same manufacturer.

1.2 Acceptable Manufacturers

Automatic transfer switches shall be ASCO Series 300. Equal by the supplied generator manufacturer will be acceptable.

1.3 Codes and Standards

The automatic transfer switches and accessories shall conform to the requirements of:

- A. UL 1008 - Standard for Automatic Transfer Switches
- B. NFPA 70 - National Electrical Code
- C. NFPA 110 - Emergency and Standby Power Systems
- D. IEEE Standard 446 - IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
- E. NEMA Standard ICS10-1993 (formerly ICS2-447) - AC Automatic Transfer Switches
- F. NEC Articles 700, 701, 702
- G. International Standards Organization ISO 9001: 2000

PART 2 PRODUCTS

2.1 Mechanically Held Transfer Switch

- A. The transfer switch unit shall be electrically operated and mechanically held. The electrical operator shall be a single-solenoid mechanism, momentarily energized. Main operators which include overcurrent disconnect devices will not be accepted. The switch shall be mechanically interlocked to ensure only one of two possible positions, normal or emergency.
- B. The switch shall be positively locked and unaffected by momentary outages so that

contact pressure is maintained at a constant value and temperature rise at the contacts is minimized for maximum reliability and operating life.

- C. All main contacts shall be silver composition. Switches rated 600 amperes and above shall have segmented, blow-on construction for high withstand current capability and be protected by separate arcing contacts.
- D. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. A manual operating handle shall be provided for maintenance purposes. The handle shall permit the operator to manually stop the contacts at any point throughout their entire travel to inspect and service the contacts when required.
- E. Designs utilizing components of molded-case circuit breakers, contactors, or parts thereof which are not intended for continuous duty, repetitive switching or transfer between two active power sources are not acceptable.
- F. Neutral conductors are to be solidly connected. A neutral terminal plate with fully-rated AL-CU pressure connectors shall be provided.

2.2 Microprocessor Controller with Membrane Interface Panel

- A. The controller shall direct the operation of the transfer switch. The controller's sensing and logic shall be controlled by a built-in microprocessor for maximum reliability, minimum maintenance, and inherent serial communications capability. The controller shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the controller to be disconnected from the transfer switch for routine maintenance.
- B. The controller shall be enclosed with a protective cover and be mounted separate from the transfer switch unit for safety and ease of maintenance. Sensing and control logic shall be provided on printed circuit boards. Interfacing relays shall be industrial grade plug-in type with dust covers.
- C. The controller shall meet or exceed the requirements for Electromagnetic Compatibility (EMC) as follows:
 - 1. ANSI C37.90A/IEEE 472 Voltage Surge Test
 - 2. NEMA ICS - 109.21 Impulse Withstand Test
 - 3. IEC801-2 Electrostatic discharge (ESD) immunity
 - 4. ENV50140 and IEC 801 - 3 Radiated electromagnetic field immunity
 - 5. IEC 801 - 4 Electrical fast transient (EFT) immunity
 - 6. ENV50142 Surge transient immunity
 - 7. ENV50141: Conducted radio-frequency field immunity
 - 8. EN55011: Group 1, Class A conducted and radiated emissions
 - 9. EN61000 -4 - 11 Voltage dips and interruptions immunity

2.3 Enclosure

- A. The ATS shall be furnished in a NEMA type 1 enclosure unless otherwise shown on the plans.
- B. Controller shall be flush-mounted display with LED indicators for switch position and source acceptability. It shall also include test and time delay bypass switches.

PART 3 OPERATION

3.1 Voltage and Frequency Sensing

- A. The voltage of each phase of the normal source shall be monitored, with pickup adjustable to 95% of nominal and dropout adjustable from 70% to 90% of pickup setting.
- B. Single-phase voltage and frequency sensing of the emergency source shall be provided.

3.2 Time Delays

- A. An adjustable time delay shall be provided to override momentary normal source outages and delay all transfer and engine starting signals.
- B. An adjustable time delay shall be provided on transfer to emergency, adjustable from 0 to 5 minutes for controlled timing of transfer of loads to emergency.
- C. A generator stabilization time delay shall be provided after transfer to emergency.
- D. An adjustable time delay shall be provided on retransfer to normal, adjustable to 30 minutes. Time delay shall be automatically bypassed if emergency source fails and normal source is acceptable.
- E. A 5-minute cooldown time delay shall be provided on shutdown of engine generator.
- F. All adjustable time delays shall be field adjustable without the use of special tools.

3.3 Additional Features

- A. A set of contacts rated 5 amps, 32 VDC shall be provided for a low-voltage engine start signal. The start signal shall prevent dry cranking of the engine by requiring the generator set to reach proper output, and run for the duration of the cool down setting, regardless of whether the normal source restores before the load is transferred.
- B. A push-button type test switch shall be provided to simulate a normal source failure.
- C. A push-button type switch to bypass the time delay on transfer to emergency, the engine exerciser period on the retransfer to normal time delay whichever delay is active at the time the push-button is activated.
- D. Terminals shall be provided for a remote contact which opens to signal the ATS to transfer to emergency and for remote contacts which open to inhibit transfer to emergency and/or retransfer to normal.
- E. Auxiliary contacts, rated 10 amps, 250 VAC shall be provided consisting of one contact, closed when the ATS is connected to the normal source and one contact, closed, when the ATS is connected to the emergency source.

- F. Indicating lights shall be provided, one to indicate when the ATS is connected to the normal source (green) and one to indicate when the ATS is connected to the emergency source (red). Also provide indicating lights for both normal and emergency source availability.
- G. Terminals shall be provided to indicate actual availability of the normal and emergency sources, as determined by the voltage sensing pickup and dropout settings for each source.
- H. Engine Exerciser - An engine generator exercising timer shall be provided, including a selector switch to select exercise with or without load transfer.
- I. Inphase Monitor - An Inphase monitor shall be inherently built into the controls. The monitor shall control transfer so that motor load inrush currents do not exceed normal starting currents, and shall not require external control of power sources. The inphase monitor shall be specifically designed for and be the product of the ATS manufacturer.
- J. Selective Load Disconnect - A double throw contact shall be provided to operate after a time delay, adjustable to 20 seconds prior to transfer and reset 0 to 20 seconds after transfer. This contact can be used to selectively disconnect specific load(s) when the transfer switch is transferred. Output contacts shall be rated 6 amps at 28 VDC or 120 VAC.

Optional Accessories

- K. Communications Interface - Serial Module (5110) to allow local or remote communications with ASCO *PowerQuest*® or *SiteWeb*™ communication products. The module shall be used to connect the Series 300, and ASCO ATS Annunciators to the serial network via an RS-485 interface. The module shall have two port connectors used for ATS & Standalone Power Manager connectivity. (Accessory 72A).
- L. Programmable Engine Exerciser - A seven or fourteen day programmable engine exerciser with digital readout display. Shall include one form C contact for availability of normal and emergency sources. Include "with or without" load control switch for exerciser period. The exerciser shall be backed up by a permanent battery. (Accessory 11BG).

PART 4 ADDITIONAL REQUIREMENTS

4.01 Withstand and Closing Ratings

A. The ATS shall be rated to close on and withstand the available rms symmetrical short circuit current at the ATS terminals with the type of overcurrent protection shown on the plans. WCR ATS ratings as be 65,000A when used with specific circuit breakers.

4.2 Tests and Certification

- A. The complete ATS shall be factory tested to ensure proper operation of the individual components and correct overall sequence of operation and to ensure that the operating transfer time, voltage, frequency and time delay settings are in compliance with the specification requirements.
- B. Upon request, the manufacturer shall provide a notarized letter certifying compliance with all of the requirements of this specification including compliance with the above codes and standards, and withstand and closing ratings. The certification shall identify, by serial number(s), the equipment involved. No exceptions to the specifications, other than those stipulated at the time of the submittal, shall be included in the certification.
- C. The ATS manufacturer shall be certified to ISO 9001: 2000 International Quality Standard and the manufacturer shall have third party certification verifying quality assurance in design/development, production, installation and servicing in accordance with ISO 9001: 2000.

4.3 Service Representation

- A. The ATS manufacturer shall maintain a national service organization of company-employed personnel located throughout the contiguous United States. The service center's personnel must be factory trained and must be on call 24 hours a day, 365 days a year.
- B. The manufacturer shall maintain records of each switch, by serial number, for a minimum of 20 years.
- C. For ease of maintenance, the transfer switch nameplate shall include drawing numbers and serviceable part numbers.

END OF SECTION

SECTION 26 5100
INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install lighting system as described in Contract Documents, complete with lamps.
- B. Related Requirements:
 - 1. Section 26 0501: Common Electrical Requirements.
- C. Reference Standards:
 - 1. Federal Communications Commission (FCC):
 - a. Code of Federal Regulations (CFR):
 - 1) FCC 47 CFR Part 18, 'Industrial, Scientific, and Medical Equipment.'
 - 2. Institute of Electrical and. Electronics Engineers (IEEE) / American National Standards Institute (ANSI):
 - a. IEEE / ANSI C62.41.1-2002, 'Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits.'

PART 2 - PRODUCTS

2.1 ASSEMBLIES

- A. Manufacturers: Provide fixtures equal to those specified in fixture schedule.
- B. Factory Assembly:
 - 1. Fixtures shall be fully assembled complete with necessary wiring, sockets, lamps, reflectors, ballasts, auxiliaries, plaster frames, recessing boxes, hangers, supports, lenses, diffusers, and other accessories essential for complete working installation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Interface With Other Work:
 - 1. Coordinate fixture locations with GC and other trades.
 - 2. In mechanical equipment rooms, coordinate locations of light fixtures with equipment locations to provide proper room illumination without obstruction. Suspend fixtures that must be mounted below pipes, ducts, etc, with chains or other Architect approved method.
- B. Securely mount fixtures. Support fixtures weighing **50 lbs** or more from building framing or structural members.
- C. Where recessed fixtures are to be installed, provide openings, plaster rings, etc, of exact dimensions for such fixtures to be properly installed. Coordinate fixture installation with ceiling type and thickness.

Terminate circuits for recessed fixtures in an extension outlet box near fixture and connect with specified flexible conduit.

3.2 ADJUSTMENT

- A. Repair scratches or nicks on exposed surfaces of fixtures to match original undamaged conditions.

END OF SECTION

SECTION 26 5600

EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install exterior lighting system as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 26 0501: Common Electrical Requirements.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Materials:
 - 1. Exterior Fixtures:
 - a. Provide as scheduled. Finish to be selected.
 - 2. Parking Area Poles:
 - a. Designed for wind loading required for Project location as determined by Architect.
 - b. Aluminum hinged base type with matching aluminum anchor bolt cover secured to base.
 - c. Include hand hole with cover at pole base.
 - d. Finish And Color to be selected.
 - 3. Exterior Lighting Control:
 - a. Digital Time Switch:
 - 1) 7 day digital time switch, LCD display, permanent schedule retention, 10 hour minimum power outage backup, multiple on and off setting points, capable of different schedules each day of the week, 120 volts, NEMA 1 enclosure.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Intermatic: ET1705PD82.
 - b) Paragon: EC7004/120.
 - c) Tork: EW101B.
 - b. Photo Cell:
 - 1) 120 volts.
 - 2) Approved Products.
 - a) Paragon: CW201-00.
 - b) Tork: 2101.
 - c. Lighting Contactor:
 - 1) 120 volt coil, 20 amps, 4 pole, NEMA 1 enclosure.

PART 3 - EXECUTION

3.1 INSTALLATION

1. Coordinate location of anchor bolts and conduit in concrete bases so pole will be properly mounted and centered on base.
2. Install time switch and contactor inside building to control parking area lighting and building sign. Provide photocell for building mounted exterior lighting.
3. Locate photocell outside building under soffit and away from any light source and direct sunlight.

END OF SECTION

SECTION 28 3101

FIRE DETECTION AND ALARM

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install fire alarm and detection system as described in Contract Documents.
 - 2. Furnish and install **raceways**, cable and conductors, boxes, and miscellaneous items necessary for complete system.

1.2 REFERENCES

- A. National Fire Protection Association:
 - 1. NFPA 72, 'National Fire Alarm and Signaling Code.' (2010 Edition).
- B. Underwriters Laboratories:
 - 1. UL 1481, 'Power Supplies for Fire-Protective Signaling Systems'.
 - 2. UL 268, 'Smoke Detectors for Fire Alarm Systems'.
 - 3. UL 464, 'Audible Signal Appliances'.
 - 4. UL 521, 'Heat Detectors for Fire Protective Signaling Systems'.
 - 5. UL 864, 'Control Units and Accessories for Fire Alarm Systems'.

1.3 SUBMITTALS

- A. Submittals:
 - 1. Shop Drawings:
 - a. Prepared by authorized factory representative and including:
 - 1) Single line diagram of actual system. Typical riser diagrams are not acceptable.
 - 2) Complete wiring diagrams.
 - 3) Manufacturer's original catalog data and descriptive information on each piece of equipment to be used.
- B. Informational Submittals:
 - 1. Certificates:
 - a. Certificate of completion, from Manufacturer's Representative, in accordance with NFPA 72 requirements.
- C. Closeout Submittals:
 - 1. Include following information in Operations And Maintenance Manual:
 - a. Operations and Maintenance Data:
 - 1) Provide operating and maintenance instructions for each item of equipment submitted under Product Data.

- 2) Provide instruction manual from Manufacturer that explains what is to be done in event of various indications.
- b. Record Documentation:
 - 1) Include copy of approved shop drawings.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 1. System shall meet approval of authority having jurisdiction (AHJ). NEC and local ordinances and regulations shall govern unless more stringent requirements are specified.
 2. Equipment, devices, and cable shall be UL listed for use in fire alarm systems.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Manufacturers:
 1. Acceptable Manufacturers:
 - a. Fire-Lite Alarms, Northford, CT www.firelite.com.
 - b. EST by Edwards, Bradenton, FL www.edwardsutcs.com.
 - c. Silent Knight Security Systems, Northford CT www.silentknight.com.
 - d. Equal as approved by Architect before bidding..
- B. Performance:
 1. Design Criteria:
 - a. Automatic fire alarm system consisting of control panel, power supplies, alarm initiating devices, notification appliances, and off-site communicating devices. System shall be non-coded, addressable, and monitored for integrity of conductors.
 - b. Class A loop type initiating device circuits and Class A loop type notification appliance circuits.
 - c. Equipment and accessories furnished under this Specification shall be standard products of single manufacturer, or include written statement by Control Panel Manufacturer confirming compatibility of components and inclusion of these components under system warranty.
- C. Operation:
 1. Operation Sequences:
 - a. Operation of manual station or automatic activation of any smoke detector, heat detector, or sprinkler flow device shall:
 - 1) Cause system notification appliances to operate.
 - 2) Indicate device in alarm on control panel.
 - 3) Initiate off-site alarm notification system.
 - 4) Indicate device in alarm on remote annunciator.
 - b. System shall return to normal when operated device is returned to normal and control panel is manually reset, except alarms may be silenced as specified below.
 - c. Alarm may be silenced by switch in control panel.
 - 1) Ring Back Feature: When silenced, this shall not prevent the resounding of subsequent alarms if another zone should alarm.
 - d. Green pilot LED, or other visual annunciation, shall normally be on indicating that system is receiving normal power. In addition, failure of normal power shall be annunciated.
 - e. Trouble alarm and annunciation, operating together, shall signal trouble condition. Following conditions shall signal trouble condition:
 - 1) Failure of normal power.
 - 2) Opens or short circuits on indicating circuits.
 - 3) Disarrangements in system wiring.

- 4) Control panel circuit board removal.
- 5) Ground faults.
- 6) Trouble silencing switch shall silence trouble alarm, but visual annunciation shall remain on until system is restored to normal. As ring-back feature, trouble alarm shall resound as reminder to return silencing switch to normal position.
- f. Supervisory LED, separate from trouble LED, and alarm, operating together, shall signal operation of supervisory device, such as control valve tamper, low air pressure, and low temperature switches. Alarm silence switch shall operate in same manner as trouble alarm.

D. Components:

1. Control Panel:

- a. Listed under UL Standard 864.
- b. Solid-state design with flush or semi-flush mounting.
- c. Control functions shall be behind locked door with annunciating devices visible through door. Single key shall operate all keyed functions in system. Provide three keys.
- d. Each addressable loop shall be electrically supervised in accordance with wiring style specified.
- e. Provide integral surge protection.
- f. Make provisions for connection to off-site alarm notification system including all required programming. Provide separate dry contacts for alarm and supervisory/trouble alarms.
- g. Power Supply:
 - 1) Provide indication of normal power supply.
 - 2) Loss of normal power shall activate trouble alarm.
 - 3) Meet requirements of and size in accordance with UL Standard 1481 and NFPA 72.
 - 4) Include standby batteries, charger, and automatic transfer equipment.
- h. Visual Annunciation:
 - 1) Separate indication on each device for alarm, trouble, or supervisory conditions.
 - 2) Visual indication shall be by LED lights or other easily identifiable method.
 - 3) Fault or trouble condition on any device shall not affect any other device.
- i. Audible Horn Alarm Annunciation:
 - 1) Provide separate and distinct alarm signals for alarm and trouble conditions.
 - 2) Alarm signal shall also operate strobe lights, if specified.
 - 3) Provide alarm silence switches at control panel.
 - 4) Trouble alarm shall be horn integral to control panel.
 - 5) Supervisory alarm may be same audible alarm as trouble alarm, but with separate visual annunciation.

2. Off-Site Alarm Notification System

- a. Provide two (2) telephone lines to fire alarm control panel.
- b. Provide dialer system equipment and programming compatible with Owner selected monitoring service.
- c. Owner will arrange for monitoring connection contract.

3. Alarm Initiating Devices:

- a. Smoke Detectors:
 - 1) Photoelectric type.
 - 2) Listed under UL Standard 268.
 - 3) Provide visual indication of alarm on unit.
- b. Heat Detectors:
 - 1) Non-settable 135 deg F fixed temperature.
 - 2) Provide visible indication that device has operated.
 - 3) Listed under UL Standard 521.
- c. Manual Fire Alarm Boxes:
 - 1) Non-coded and double-action requiring two actions to initiate alarm. Breakable glass type is not approved.
 - 2) Box shall mechanically latch when actuated and require key to reset. Key shall match control panel door lock.

4. Notification Appliances:

- a. Color: Red
- b. Combination Horn / Strobe:

- 1) Wall mounted flush or semi-flush.
 - 2) Non-coded audible output of 90 dB minimum at **10 feet**.
 - 3) Integrally mounted flashing light unit with block letters 'FIRE.' Minimum light intensity as specified on plans and flash rate between one and three Hertz.
 - 4) Listed under UL Standards 464 and 1971.
- c. Strobe Only:
- 1) Wall mounted flush or semi-flush.
 - 2) Integrally mounted flashing light unit with block letters 'FIRE.' Minimum light intensity as specified on plans and flash rate between one and three Hertz.
 - 3) Listed under UL Standard 1971.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install fire alarm and detection systems as indicated, in accordance with Equipment Manufacturer's written instructions, and complying with applicable portions of NEC, NFPA, and NECA's 'Standard of Installation.'
1. Mounting Heights:
 - a. Unless otherwise indicated, mount center of outlets or boxes at following heights above finish floor:
 - 1) Control Panel: **72 inches** to top.
 - 2) Wall-Mounted Horn / Strobe: **90 inches** or **6 inches** below ceiling, whichever is greater.
 - 3) Wall-Mounted Strobe: **90 inches** or **6 inches** below ceiling, whichever is greater.
 - 4) Manual pull stations: **48 inches**.
 - 5) Remote annunciator panel: **60 inches**.
 2. Locate fire alarm manual stations **24 inches** minimum away from any light switch.
- B. Identification:
1. Post copy of wire identification list inside fire alarm panel door or other area accessible to fire alarm service personnel.
 2. Print location of circuit disconnecting means inside panel.
- C. Conductors:
1. Install conductors and make connections to water flow switches, valve tamper switches, low air pressure switches, and duct smoke detectors.
 2. Loop wires through each device on zone for proper supervision. Tee-taps not permitted.
 3. Minimum conductor size shall be 14 AWG unless otherwise specified.
- D. Do not install ceiling mounted detectors within **36 inches** of air discharge grilles. Do not install manual fire alarm boxes within **24 inches** of light switches. Coordinate with other trades as required.

3.2 FIELD QUALITY CONTROL

- A. Field Tests:
1. Provide factory-trained representative to perform complete system testing in presence of Owner's representative and local fire department personnel upon completion of installation.
 - a. Test each initiating and annunciating device for proper operation, except fixed temperature heat detectors.
 - b. Test operation of trouble annunciation on each circuit.
 - c. Perform complete testing of control panel functions including off-site monitoring.

3.3 CLOSEOUT ACTIVITIES

- A. Instruction Of Owner:
 - 1. Instruct Owner's Representative in proper operation and maintenance procedures.

3.4 PROTECTION

- A. Provide dust protection for installed smoke detectors until finish work is completed and building is ready for occupancy.
- B. Protect conductors from cuts, abrasion and other damage during construction.

END OF SECTION