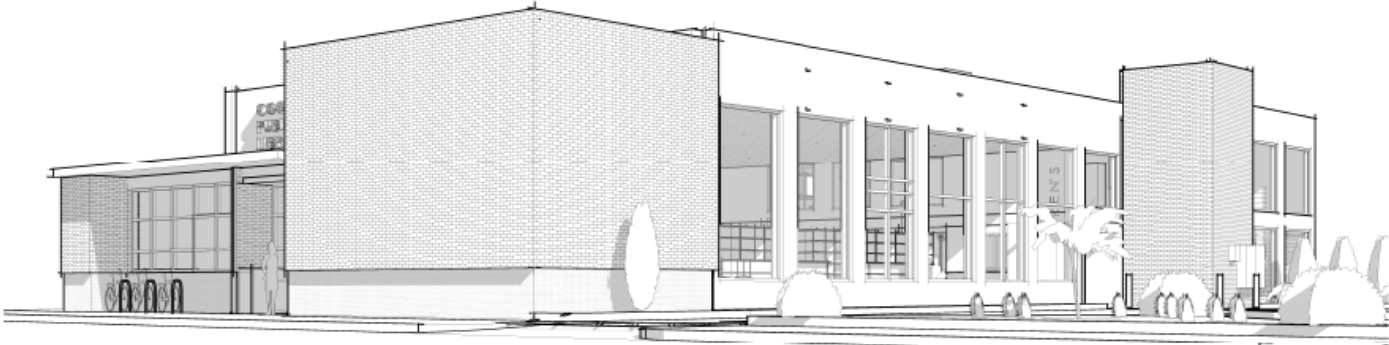


# PROJECT MANUAL

For:

## COQUILLE PUBLIC LIBRARY BUILDING RENOVATION AND ADDITION

259 North Adams Street  
Coquille, Oregon  
HGE Project #22.37



333 S. 4TH STREET  
COOS BAY, OREGON 97420  
P: 541.269.1166  
www.hge1.com

For:  
CITY OF COQUILLE  
July 2023

BLANK PAGE

**SECTION 00-0101  
PROJECT TITLE PAGE**

**PROJECT MANUAL**

**FOR**

**COQUILLE PUBLIC LIBRARY BUILDING - RENOVATION AND ADDITION**

**CITY OF COQUILLE**

**295 NORTH ADAMS STREET, COQUILLE, OREGON 97423**

**JULY 2023**

**PROJECT 22.37**

**HGE ARCHITECTS, INC.**

**333 SOUTH 4TH STREET**

**COOS BAY, OREGON 97420**

**(541) 269-1166**

**END OF SECTION**

BLANK PAGE

**SECTION 00-0110  
TABLE OF CONTENTS**

**PROCUREMENT AND CONTRACTING REQUIREMENTS**

**1.01 DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS**

- A. 00-0101 - Project Title Page
- B. 00-0110 - Table of Contents
- C. 00-1113 - Advertisement for Bids
- D. 00-2113 - Instructions to Bidders
- E. AIA Document A701 - 2018 Instructions to Bidders
- F. 00-2210 - Supplementary Instructions to Bidders
- G. Substitution Request Form (During Bid Phase)
- H. 00-4100 - Bid Form
- I. WH-179 OR First Tier Subcontractor Disclosure Form
- J. 00-7200 - General Conditions
- K. AIA Document A201-2017; General Conditions of the Contract for Construction
- L. 00-7300 - Supplementary Conditions
- M. 00-7346 - BOLI Prevailing Wage Rates

**SPECIFICATIONS**

**2.01 DIVISION 01 -- GENERAL REQUIREMENTS**

- A. 01-1000 - Summary
- B. 01-2300 - Alternates
- C. 01-3000 - Administrative Requirements
- D. 01-4000 - Quality Requirements
- E. 01-5000 - Temporary Facilities and Controls
- F. 01-6000 - Product Requirements
- G. 01-7000 - Execution and Closeout Requirements
- H. 01-7800 - Closeout Submittals
- I. 01-7900 - Demonstration and Training

**2.02 DIVISION 02 -- EXISTING CONDITIONS**

- A. 02-4100 - Demolition

**2.03 DIVISION 03 -- CONCRETE**

- A. 03-1000 - Concrete Forming and Accessories
- B. 03-2000 - Concrete Reinforcing
- C. 03-3000 - Cast-in-Place Concrete

**2.04 DIVISION 04 -- MASONRY**

- A. 04-2000 - Unit Masonry
- B. 04-4200 - Exterior Stone Cladding

**2.05 DIVISION 05 -- METALS**

- A. 05-5000 - Metal Fabrications
- B. 05-5150 - Ladders
- C. 05-7311 - Decorative Metal and Glazed Metal Railings - VIVA

**2.06 DIVISION 06 -- WOOD, PLASTICS, AND COMPOSITES**

- A. 06-1000 - Rough Carpentry
- B. 06-1800 - Glued-Laminated Construction
- C. 06-2000 - Finish Carpentry
- D. 06-4100 - Architectural Wood Casework

**2.07 DIVISION 07 -- THERMAL AND MOISTURE PROTECTION**

- A. 07-1300 - Sheet Waterproofing
- B. 07-1900 - Water Repellents
- C. 07-2100 - Thermal Insulation
- D. 07-2500 - Weather Barriers
- E. 07-4646 - Fiber-Cement Siding
- F. 07-5400 - Thermoplastic Membrane Roofing
- G. 07-6200 - Sheet Metal Flashing and Trim
- H. 07-7200 - Roof Accessories
- I. 07-9005 - Joint Sealers

**2.08 DIVISION 08 -- OPENINGS**

- A. 08-1113 - Hollow Metal Doors and Frames

- B. 08-1416 - Flush Wood Doors
- C. 08-3326 - Overhead Coiling Grilles
- D. 08-4229 - Automatic Entrances
- E. 08-4313 - Aluminum-Framed Storefronts
- F. 08-7100 - Door Hardware
- G. 08-8000 - Glazing

**2.09 DIVISION 09 -- FINISHES**

- A. 09-2116 - Gypsum Board Assemblies
- B. 09-2400 - Cement Plastering
- C. 09-3000 - Tiling
- D. 09-5153 - Direct-Applied Acoustical Ceilings
- E. 09-6433 - Laminated Wood Flooring
- F. 09-6500 - Resilient Flooring
- G. 09-6813 - Tile Carpeting
- H. 09-9000 - Painting and Coating

**2.10 DIVISION 10 -- SPECIALTIES**

- A. 10-1400 - Signage
- B. 10-1419 - Dimensional Letter Signage
- C. 10-2600 - Wall and Door Protection
- D. 10-2800 - Toilet, Bath, and Laundry Accessories
- E. 10-4400 - Fire Protection Specialties

**2.11 DIVISION 14 -- CONVEYING EQUIPMENT**

- 14-2400 - Machine Room-less Hydraulic Elevators

**2.12 DIVISION 21 -- FIRE SUPPRESSION**

- A. 21-1300 - Fire-Suppression Sprinkler System

**2.13 DIVISION 22 -- PLUMBING**

- A. 22-0500 - Plumbing Materials and Methods
- B. 22-0700 - Plumbing Insulation
- C. 22-1000 - Plumbing Piping and Pumps

- D. 22-3000 - Plumbing Equipment
- E. 22-4000 - Plumbing Fixtures

**2.14 DIVISION 23 -- HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)**

- A. 23-0500 - HVAC Materials and Methods
- B. 23-0548 - Mechanical Sound and Vibration Control
- C. 23-0590 - Testing, Adjusting & Balancing
- D. 23-0700 - HVAC Insulation
- E. 23-2300 - Refrigerant Piping System
- F. 23-3000 - Air Distribution
- G. 23-3400 - HVAC Fans
- H. 23-4000 - HVAC Air Filters
- I. 23-7400 - Packaged HVAC Units
- J. 23-8000 - Terminal HVAC Equipment

**2.15 DIVISION 26 -- ELECTRICAL**

- A. 26-0500 - Materials & Methods
- B. 26-0510 - Raceways Boxes & Conductors
- C. 26-0526 - Grounding & Bonding
- D. 26-0529 - Hangers & Supports
- E. 26-2400 - Switchboards & Panelboards
- F. 26-2730 - Wiring Devices, Floorboxes, & Controls
- G. 26-5100 - Lighting Fixtures

**2.16 DIVISION 27 -- COMMUNICATIONS**

- A. 27-2500 - Telephone & Computer Data

**2.17 DIVISION 28 -- ELECTRONIC SAFETY AND SECURITY**

- A. 28-3100 - Fire Alarm & Detection

**2.18 DIVISION 31 -- EARTHWORK**

- A. 31-2316 - Excavation
- B. 31-2323 - Fill

**2.19 DIVISION 32 -- EXTERIOR IMPROVEMENTS**



- A. 32-1123 - Aggregate Base Courses
- B. 32-1216 - Asphalt Paving
- C. 32-1313 - Concrete Paving
- D. 32-1713 - Parking Bumpers
- E. 32 1723.13 - Painted Pavement Markings
- F. 32-1726 - Tactile Warning Surfacing

**END OF SECTION**

BLANK PAGE

## ADVERTISEMENT FOR BIDS

Notice is hereby given that sealed bids for **Coquille Public Library Building - Renovation and Addition** project, will be received by the City of Coquille no later than the bid closing time of **2:00 P.M., Thursday, August 17, 2023.**

Bids shall be submitted to the City of Coquille by mail/hand delivery: Coquille City Hall, 851 N Central Blvd., Coquille, OR 97423. Bids shall be identified as: BID for Coquille Public Library Building - Renovation and Addition. Bids will be publicly opened and read aloud immediately following the bid closing time at 2:00 P.M in the Coquille City Hall Council Chambers, 851 N Central Blvd., Coquille, OR 97423.

Work on this Project consists of the remodel of an existing former bank building into the Coquille Public Library. The existing building area of 8,560 sf is scheduled for renovation and minor alternations. An elevator and stair building addition is also part of the work, approximately 292 sf, for a total project area of 8,852 sf. Interior work includes demolition, vault door removal, partitions, restroom replacement, casework, doors, acoustical ceilings, flooring, elevator, fire suppression sprinkler system, plumbing, replacement HVAC, and replacement electrical systems.

Contract Documents for this work, including Instructions to Bidders and Bid Form, may be examined at the Office of the Architect, HGE Architects, Inc., 333 South 4<sup>th</sup> Street, Coos Bay, Oregon, phone: 541- 269-1166, email: [general@hge1.com](mailto:general@hge1.com), and at the following locations: Coquille City Hall, various Plan Centers, and on the HGE website at <http://www.hge1.com/bidding-area/>. General Contractors are encouraged to contact HGE ARCHITECTS, INC., by phone or email and register their interest in submitting a bid and to be included in the plan holders' list.

One set of large format drawings, specifications and contract documents may be obtained by prime bidders from HGE ARCHITECTS, INC., upon refundable deposit of \$100.

**A Non-Mandatory pre-bid meeting and walk-through will be held at the job site on Tuesday, August 1, 2023, at 11:00 a.m.** Contractors shall meet at the project site, 295 North Adams, Coquille, Oregon. Contractors and subcontractors are encouraged to attend.

The Owner reserves the right to reject any and all bids, and to waive any technicalities or informalities in connection therewith. No bidder may withdraw his bid after the hour set for the opening thereof until the lapse of thirty (30) days from the bid opening.

By: Forrest Neuerburg, City Manager  
City of Coquille

Published:

*Daily Journal of Commerce*  
Portland, Oregon  
Date: July 17, 2023

*The World Newspaper*  
Coos Bay, Oregon  
Date: July 18, 2023

*The Coquille Valley Sentinel*  
Coquille, Oregon  
Date: July 19, 2023

BLANK PAGE

**SECTION 00-2113  
INSTRUCTIONS TO BIDDERS**

**SUMMARY**

**1.01 SEE AIA DOCUMENT A701 (2018 EDITION), INSTRUCTIONS TO BIDDERS FOLLOWING THIS DOCUMENT .**

**1.02 RELATED DOCUMENTS**

- A. Document 00-1113 - Advertisement for Bidders
- B. AIA Document A701 - 2018 INSTRUCTIONS TO BIDDERS
- C. Document 00-2210 - Supplementary Instructions To Bidders
- D. Document 00-4100 - Bid Form

**INVITATION**

**2.01 BID SUBMISSION**

- A. Refer to Advertisement for Bids for information regarding bid closing and delivery location.
- B. Offers submitted after the above time shall be returned to the bidder unopened.
- C. A two-hour period shall follow in which all bidders shall submit a Subcontractor Disclosure Form, identifying any first-tier subcontractor that will be furnishing labor or labor and materials on the Contract. Refer to Disclosure Form, Instructions to Bidders, and supplements within the Contract Documents.
- D. Offers will be opened publicly immediately after the time for receipt of bids. Refer to Advertisement for Bids for detail regarding location.

**BID DOCUMENTS AND CONTRACT DOCUMENTS**

**3.01 DEFINITIONS**

- A. Bid Documents: Contract Documents supplemented with Advertisement for Bids, Instructions to Bidders, Bid Form, Supplements To Bid Forms and Appendices and Bid securities identified.
- B. Contract Documents: Defined in Project Manual including issued Addenda.

**3.02 AVAILABILITY**

- A. Bid Documents may be obtained at the office of Architect which is located at 333 South 4th Street, Coos Bay, Oregon, 97420. Phone: 541-269-1166, fax 541-269-1833.
- B. One set of Bid Documents can be obtained by general contract bidders free of charge upon receipt of a refundable deposit, by cash or check, in the amount of \$100.00 for one set.

- C. Deposit will be refunded if Bid Documents are returned complete, undamaged, unmarked and reusable, no later than bid opening date. Failure to comply will result in forfeiture of deposit.
- D. Architect's website document access:
  - 1. PDF digital copies of these documents are also available to Bidders via Architect's website at [www.hge1.com/open-to-bid](http://www.hge1.com/open-to-bid).
- E. Bid Documents are made available only for the purpose of obtaining offers for this project. Their use does not grant a license for other purposes.

### **3.03 EXAMINATION**

- A. Bid Documents may be viewed at the Architect's office; HGE Architects Inc., and various plan centers.
- B. Upon receipt of Bid Documents verify that documents are complete. Notify Architect should the documents be incomplete.
- C. Immediately notify Architect upon finding discrepancies or omissions in the Bid Documents.

### **3.04 INQUIRIES/ADDENDA**

- A. Direct questions to Architect, telephone 1-541-269-1166, email [general@hge1.com](mailto:general@hge1.com).
- B. Addenda may be issued during the bidding period. All Addenda become part of the Contract Documents. Include resultant costs in the Bid Amount. Addendums will be prepared and distributed by the Architect.
- C. Verbal answers are not binding on any party.
- D. Clarifications requested by bidders must be in writing not less than 7 days before date set for receipt of bids. The reply will be in the form of an Addendum, a copy of which will be forwarded to known recipients.

## **SITE ASSESSMENT**

### **4.01 SITE EXAMINATION**

- A. Examine the project site before submitting a bid. Refer to Article 2 Bidder's Representations, AIA Document A701 Instructions to Bidders.
- B. A pre-bid conference and project job walk will be held. Refer to the Advertisement for Bids for more information

## **QUALIFICATIONS**

### **5.01 BIDDER'S QUALIFICATIONS**

- A. Successful bidder must be registered with the Construction Contractor's Board as required by ORS 701.035 to 701.055.
- B. Successful bidder must demonstrate the bidder's responsibility under ORS 279C.375 (3)(b).
- C. Bidder is required to be licensed for asbestos abatement under ORS 468A.720.

## **BID SUBMISSION**

### **6.01 SUBMISSION PROCEDURE**

- A. Bidders shall be solely responsible for the delivery of their bids in the manner and time prescribed.
- B. Submit one copy of the executed offer on the Bid Forms provided, signed and sealed with the required security in a closed opaque envelope, clearly identified with bidder's name, project name and Owner's name on the outside.
- C. An abstract summary of submitted bids will be made available to all bidders following bid opening.

## **BID ENCLOSURES/REQUIREMENTS**

### **7.01 BID FORM REQUIREMENTS**

- A. This contract is for public work and is subject ORS 279C.800 to 279C.870 regarding prevailing wage rates. Bids must be fully completed in the manner provided in the Instructions to Bidders upon the official bid form provided within the Project Manual, and accompanied by a certified check or a bid bond executed in favor of the Owner in an amount not less than ten percent (10%) of the total amount of the bid per ORS 279C.385, to be forfeited as fixed and liquidated damages should the bidder fail or neglect to enter into a contract and provide suitable bond for the faithful performance of the work in the event the contract is awarded.

## **OFFER ACCEPTANCE/REJECTION**

### **8.01 ACCEPTANCE OF OFFER**

- A. Owner reserves the right to accept or reject any or all offers and to waive any technicalities or informalities in connection therewith.
- B. Owner may reject any bid that does not comply with prescribed public contracting procedures and requirements, including the bidder's responsibility under ORS 279C.375 (3)(b).
- C. Owner may reject for good cause all bids upon finding that it is in the public interest to do so.
- D. After acceptance by Owner, Architect on behalf of Owner, will issue to the successful bidder, a written letter of Contract Award.

**END OF SECTION**

BLANK PAGE



# AIA® Document A701® – 2018

## Instructions to Bidders

for the following Project:

*(Name, location, and detailed description)*

### 22.37 City of Coquille - Coquille Public Library Building Renovation

Work on this Project consists of the remodel of an existing former bank building into the Coquille Public Library. The existing building area of 8,560 sf is scheduled for renovation and minor alterations and then a small elevator and stair addition is also part of the work approximately 292 sf, for a total project area of 8,560 sf. Interior work includes demolition, fault door removal, partitions, restroom replacement, casework, doors, acoustical ceilings, flooring, elevator, fire suppression sprinkler system, plumbing, replacement HVAC, and replacement electrical systems.

#### THE OWNER:

*(Name, legal status, address, and other information)*

City of Coquille  
851 N. Central Blvd.  
Coquille, OR 97420  
Telephone Number: 541.396.2115

#### THE ARCHITECT:

*(Name, legal status, address, and other information)*

HGE ARCHITECTS, Inc.  
333 South 4th Street  
Coos Bay, OR 97420  
Telephone Number: 541.269.1166  
Fax Number: 541.269.1833

#### TABLE OF ARTICLES

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

#### ADDITIONS AND DELETIONS:

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

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

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

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

## ARTICLE 1 DEFINITIONS

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

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

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

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

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

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

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

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

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

## ARTICLE 2 BIDDER'S REPRESENTATIONS

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

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

## ARTICLE 3 BIDDING DOCUMENTS

### § 3.1 Distribution

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

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

See Advertisement for Bids.

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

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

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

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

### § 3.2 Modification or Interpretation of Bidding Documents

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

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing and shall be received by the Architect at least seven days prior to the date for receipt of Bids.

*(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall submit requests for clarification and interpretation.)*

Refer to Specification Section 00-2113 Instructions to Bidders

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

### § 3.3 Substitutions

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

#### § 3.3.2 Substitution Process

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

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

§ 3.3.2.3 If a Substitution Request Form is not provided, requests shall include (1) the name of the material or equipment specified in the Bidding Documents; (2) the reason for the requested substitution; (3) a complete description of the proposed substitution including the name of the material or equipment proposed as the substitute, performance and test data, and relevant drawings; and (4) any other information necessary for an evaluation. The request shall include a statement setting forth changes in other materials, equipment, or other portions of the Work, including changes in the work of other contracts or the impact on any Project Certifications (such as LEED), that will result from incorporation of the proposed substitution.

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

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

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

§ 3.4 Addenda

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

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

Addenda will be issued by email to all listed on the Plan Holder's List.

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

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

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

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

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

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

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

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

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

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

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

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

§ 4.2 Bid Security

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

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

Refer to Specification Section 00-2113 Instruction to Bidders.

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

#### § 4.3 Submission of Bids

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

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

Refer to Specification Section 00-2113 Instructions to Bidders.

§ 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.

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

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

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

#### § 4.4 Modification or Withdrawal of Bid

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

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

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

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

Bid security shall be retained until the Owner has awarded the contract or rejected all Bids.

### ARTICLE 5 CONSIDERATION OF BIDS

#### § 5.1 Opening of Bids

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

**§ 5.2 Rejection of Bids**

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

**§ 5.3 Acceptance of Bid (Award)**

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

§ 5.3.2 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.

*(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.)*

## § 7.2 Time of Delivery and Form of Bonds

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

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

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

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

## ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

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

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.

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

.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.)*

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

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

.4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:

*(Insert the date of the E203-2013.)*

.5 Drawings

Refer to Drawings dated April 2023 for complete Sheet Index.

*(Table deleted)*

- .6 Specifications  
Refer to Project Manual dated April 2023 Section 00-0110 Table of Contents for complete list of Specifications.

*(Table deleted)*

- .7 Addenda:

Number	Date	Pages
--------	------	-------

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

[ N/A ] AIA Document E204™-2017, Sustainable Projects Exhibit, dated as indicated below:  
*(Insert the date of the E204-2017.)*

[ N/A ] 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.)*



**SECTION 00-2210  
SUPPLEMENTARY INSTRUCTIONS TO BIDDERS**

**GENERAL**

**1.01 THE FOLLOWING SUPPLEMENTS SHALL MODIFY, CHANGE, DELETE FROM OR ADD TO THE AIA DOCUMENT A701-2018 INSTRUCTIONS TO BIDDERS. WHERE ANY ARTICLE OF THE INSTRUCTIONS TO BIDDERS IS MODIFIED OR ANY PARAGRAPH, SUBPARAGRAPH, OR CLAUSE THEREOF IS MODIFIED OR DELETED BY THESE SUPPLEMENTS, THE UNALTERED PROVISIONS OF THAT ARTICLE, PARAGRAPH, SUBPARAGRAPH, OR CLAUSE SHALL REMAIN IN EFFECT.**

- A. Article 1 Definitions add to as follows:
  - 1. The word Owner is City of Coquille
  - 2. The word Architect is HGE Architects, Inc.
  
- B. Article 2 Bidders Representations Subparagraph 2.1.3, add the following: If a pre-bid walkthrough is held, contractors and sub-contractor attendees are encouraged to familiarize themselves with the bidding and contract documents prior to the walkthrough.
  
- C. Article 3 Bidding Documents Subparagraph 3.1.1, add the following:
  - 1. One set of drawings, specifications and contract documents may be obtained by prime bidders from HGE, INC., upon refundable deposit of amount indicated on the advertisement for bids. Deposit made will be refunded upon return of the complete documents obtained upon return thereof in good condition within seven (7) days after opening of bids. Non-bidders deposit will be refunded if documents are returned in good condition no later than bid opening date. PDF digital copies of these documents are also available to Bidders via HGE INC.'s website. General Contractors are encouraged to contact HGE INC. office by phone or email, and register their interest in submitting a bid and to be included on the architect's plan holders list. Addendums and other critical information will be forwarded to all persons on the architect's plan holders list.
  
- D. Article 4 Bidding Procedure Subparagraph 4.1.1, add the following:
  - 1. One copy of the Bid Form and other required bidding documents shall be submitted with all blank spaces in the form fully filled.
  - 2. PREPARATION OF FIRST-TIER SUBCONTRACTOR DISCLOSURE
    - a. Per ORS 279C.370 the Bidder shall submit First-Tier Subcontractor Disclosure Form not later than 2 hours following the Bid Closing, or the bid will be rejected.
    - b. To determine disclosure requirements, the Agency recommends that you disclose subcontract information for any subcontractor and supplier as follows:
      - 1) Determine the lowest possible contract price. That price will be the base bid amount less all alternate deductive bid amounts (exclusive of any options that can only be exercised after contract award).
      - 2) Provide the required disclosure information for any first-tier subcontractor whose potential contract services (i.e., subcontractor's base bid amount plus all alternate additive bid amounts, exclusive of any options that can only be exercised after contract award) are greater than or equal to: (i) 5% of that lowest contract price, but at least \$15,000, or (ii) \$350,000 regardless of the percentage. Total all possible work for each subcontractor in making this determination (e.g., if a subcontractor will provide \$15,000 worth of services on the base bid and \$40,000 on an additive alternate, then the potential amount of subcontractor's services is \$55,000. Assuming that \$55,000 exceeds 5% of the lowest contract price, provide the disclosure for both the \$15,000 services and the \$40,000 services).

- 3) Submission. A Bidder shall submit the disclosure form required by this rule within two (2) working hours of Bid Closing in the manner specified by the ITB.
- 4) Responsiveness. Compliance with the disclosure and submittal requirements of ORS 279C.370 and this rule is a matter of Responsiveness. Bids which are submitted by Bid Closing, but for which the separate disclosure submittal has not been made by the specified deadline, are not Responsive and shall not be considered for Contract award.
- 5) Substitution. Substitution of affected first-tier subcontractors shall be made only in accordance with ORS 279C.585. Agencies do not have a statutory role or duty to review, approve, or resolve disputes concerning such substitutions. However, Agencies are not precluded from making related inquiries or investigating complaints in order to enforce Contract provisions that require compliance generally with laws, rules and regulations.
- 6) Effective Date. This rule shall apply to Public Improvement Contract first advertised on or after August 1, 2003. The above instructions have been amended to include modifications approved by the 2005 legislature.
- 7) Article 4 Bidding Procedure Subparagraph 4.2.2, add the following:

- E. Bid security in the form of Bid Bond issued by a Bonding Company acceptable to the Owner, cashier's check or certified check in an amount equal to 10% of the total bid, made payable to the Owner shall be required.

**1.02 ARTICLE 4 BIDDING PROCEDURE SUBPARAGRAPH 4.2.3, ADD THE FOLLOWING:**

- A. All Bidders will leave their bids open for a period of thirty (30) days after the date of bid opening. No bid may be withdrawn during such period of time. Owner may accept any Bid in accordance with the Instructions to Bidders within such thirty (30) day period.

**1.03 ARTICLE 5 CONSIDERATION OF BIDS ADD SUBPARAGRAPH 5.3.3:**

- A. If the Contractor is to be awarded, Owner will provide written Notice of Intent to Award to all Bidders of the Owner's intent to award the Contract. Owner's award shall not be final until the later of the following:
  1. Five (5) days after the date of the Notice of Intent; or
  2. The Owner provides a written response to all timely-filed protests that denies the protest and affirms the award.

**1.04 ARTICLE 5 CONSIDERATION OF BIDS ADD SUBPARAGRAPH 5.3.4:**

- A. Goods or services manufactured or produced in the State of Oregon to receive preference, all factors being equal.

**1.05 ARTICLE 6 POST BID INFORMATION DELETE SUBPARAGRAPH 6.1:**

- A. Contractor's Qualification Statement.

**1.06 ARTICLE 7 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND SUBPARAGRAPH 7.2.2:**

- A. A Performance Bond and Labor and Material Payment Bond shall be required. Contractor shall provide separate Performance Bond and Labor and Material Payment Bond made payable to the Owner issued by a Corporation legally licensed to transact business in the State of Oregon. Corporation issuing such a bond must comply with applicable Oregon Statutes for public work and be satisfactory to the Owner. The bonds are to be in the amount of 100% of the contract sum to assure the Owner of full and prompt performance of the Contract.

**1.07 ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR  
SUBPARAGRAPH 8.1.1 ADD THE FOLLOWING:**

- A. The Contractor shall within ten (10) days after notification in writing of the Owner's Notice to award a Contract, execute and return to the Owner the Form of Agreement, the Bonds and all applicable Certificates of Insurance.

**END OF SECTION**

BLANK PAGE



333 S. 4TH STREET  
 COOS BAY, OREGON 97420  
 P: 541.269.1166  
 www.hge1.com

# SUBSTITUTION REQUEST

(During the Bidding Phase)

Project: _____	Substitution Request Number: _____
_____	From: _____
To: _____	Date: _____
_____	A/E Project Number: _____
Re: _____	Contract For: _____

Specification Title: _____	Description: _____
Section: _____ Page: _____	Article/Paragraph: _____

Proposed Substitution: \_\_\_\_\_

Manufacturer: \_\_\_\_\_ Address: \_\_\_\_\_ Phone: \_\_\_\_\_

Trade Name: \_\_\_\_\_ Model No.: \_\_\_\_\_

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: \_\_\_\_\_

Signed by: \_\_\_\_\_

Firm: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Telephone: \_\_\_\_\_

### A/E's REVIEW AND ACTION

- Substitution approved - Make submittals in accordance with AIA Form 701-2018 Instructions to Bidders, Paragraph 3.3 Substitutions.
- Substitution approved as noted - Make submittals in accordance with AIA Form 701-2018 Instructions to Bidders, Paragraph 3.3 Substitutions.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by: \_\_\_\_\_ Date: \_\_\_\_\_

### Supporting Data Attached:

- Drawings   
  Product Data   
  Samples   
  Tests   
  Reports   
  \_\_\_\_\_

BLANK PAGE

**SECTION 00-4100  
BID FORM**

**THE PROJECT AND THE PARTIES**

**1.01 TO:**

Owner: City of Coquille.  
970 N. Central  
Coquille, Oregon 97423

**1.02 FOR: COQUILLE PUBLIC LIBRARY BUILDING - RENOVATION AND ADDITION**

A. Architect's Project Number: 22.37

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

**1.04 SUBMITTED BY:**

**NAME OF FIRM (PLEASE PRINT): \_\_\_\_\_**

**1.05 GENERAL**

- A. The Bidder declares that they have carefully examined the Contract Documents for the construction of the proposed improvements; that the Bidder has personally inspected the contemplated construction area, that the Bidder has satisfied themselves as to the quantities of materials, items of equipment, possible difficulties, and conditions of work involved.
- B. By signing this Proposal, the Bidder certifies that the provisions required by ORS 279C.800 to 279C.870 relating to prevailing wage rates shall be included in this Contract, are understood by the Bidder, and will be complied with during the Work.
- C. The bidder further declares that they are registered with the Construction Contractor's Board as required by ORS 701.35 to 701.55, and possess such additional licenses and certifications as required by law for the performance of the work proposed herein.
- D. The subcontractor(s) performing work as described in ORS 701.005(2) will be registered with the Construction Contractors Board in accordance with ORS 701.035 to 701.055 before the subcontractor(s) commence work under the Contract.
- E. Pursuant to ORS 279A.120, Bidder hereby certifies the Bidder \_\_\_\_\_ is / \_\_\_\_\_ is not (**check one**) a Resident Bidder as defined by ORS 279.029.
- F. Bidder certifies that the provisions required by ORS 279C.836, unless exempt under Sections (4), (7), (8), or (9), before starting work on this Contract, or any subcontract hereunder, Contractor and all subcontractors shall have on file with the Construction Contractor's Board a public works bond with corporate surety authorized to do business in the State of Oregon in the amount of \$30,000.

- G. The Bidder agrees that if this Proposal is accepted, the Bidder will, within ten (10) calendar days after receiving contract forms, execute the Agreement between Owner and Contractor as specified, and deliver to the Owner the Performance and Labor and Payment Bonds required herein.

**1.06 BIDS:**

- A. The undersigned bidder, in submitting his bid, authorizes the Owner to evaluate the bid and make a single award per Bid Schedule, on the basis of the bid.
- B. After having examined all of the contract documents as prepared by HGE Architects, Inc., we do hereby propose to furnish labor and materials to complete the work required by said documents for the following fixed sum (*fill in lump sum amount for each bid unit, in written words in space provided, and in numerals within parenthesis*):

C. **BASIC BID:**

\_\_\_\_\_ Dollars

and \_\_\_\_\_ Cents (\$ \_\_\_\_\_) complete.

ADD TO BASIC BID:

D. **ALTERNATE BID #1 - Window Enlargement and Replacement:**

ADD TO BASIC BID:

\_\_\_\_\_ DOLLARS

AND \_\_\_\_\_ CENTS (\$ \_\_\_\_\_) COMPLETE.

E. **ALTERNATE BID #2 - Casework:**

ADD TO BASIC BID:

\_\_\_\_\_ DOLLARS

AND \_\_\_\_\_ CENTS (\$ \_\_\_\_\_) COMPLETE.



F. **ALTERNATE BID #3 - Flag Pole:**

ADD TO BASIC BID:

\_\_\_\_\_ DOLLARS

AND \_\_\_\_\_ CENTS (\$ \_\_\_\_\_) COMPLETE.

**ALTERNATE BID #4 - Rolling Counter Door:**

ADD TO BASIC BID:

\_\_\_\_\_ DOLLARS

AND \_\_\_\_\_ CENTS (\$ \_\_\_\_\_) COMPLETE.

**ALTERNATE BID #5 - Teen Room Window Replacement:**

ADD TO BASIC BID:

\_\_\_\_\_ DOLLARS

AND \_\_\_\_\_ CENTS (\$ \_\_\_\_\_) COMPLETE.

Bidder further agrees to be bound by the entire Contract Documents, including:

- Issued Addenda
- General Conditions - AIA 201 and Supplementary Conditions
- Contract for Construction: Owner-Contractor Agreement - AIA 101
- Performance and Payment Bonds
- Specifications
- Details/Drawings
- Issued Change Orders, Construction Change Directives, and Architect's Supplemental Instructions

**1.07 BID SECURITY**

- A. Bid security in the form of a certified check of Bid Bond in the amount of 10% of the bid amount is enclosed per ORS 279C.385. The undersigned agrees that Bid Security will be left in escrow with the Owner and that the amount thereof is the measure of liquidated damages which Owner will sustain by failure of the undersigned to deliver and execute the Contract or provide Performance and Payment Bonds and may become the property of the Owner at Owner's option. If this bid is not accepted within thirty (30) days of the time set for the opening of bids or if the undersigned executes and timely delivers said contract and the Performance and Payment Bonds, the Bid Security will be returned.

**1.08 COMPLETION DATE AND LIQUIDATED DAMAGES**

- A. It is understood that time is of the essence in the execution of this Contract in order to avoid undue hardship upon the Owner. It is the desire of the Owner to issue a Notice to Proceed upon successful review of the lower qualified bidder and have the project Substantially Complete within 365 calendar days.
- B. The Undersigned agrees that he will have the work Substantially Complete on or before \_\_\_\_\_ calendar days after Notice to Proceed (*Contractor to fill in number of days he/she will require to perform the Work and this will be the agreed upon construction time period*).
- C. The Contractor agrees that said Work shall be prosecuted regularly, diligently, at such rate of progress as will insure Substantial Completion thereof within the time specified. It is expressly understood and agreed, by the Contractor and the Owner, that the time for the completion of the Work described herein is reasonable taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.
- D. If said contractor shall neglect, fail or refuse to coordinate the work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part consideration for the awarding of this Contract, to pay to the Owner the sum of **THREE HUNDRED DOLLARS (\$300)**, not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every calendar day that the contractor shall be in default after the time stipulated in the contract for substantial completion of the work.

**1.09 OWNER RIGHTS**

- A. The Owner reserves the right to reject any or all bids and to waive all informalities.

**1.10 ADDENDA**

- A. The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.

- 1. Addendum # \_\_\_\_\_ Dated \_\_\_\_\_.
- 2. Addendum # \_\_\_\_\_ Dated \_\_\_\_\_.
- 3. Addendum # \_\_\_\_\_ Dated \_\_\_\_\_.
- 4. Addendum # \_\_\_\_\_ Dated \_\_\_\_\_.
- 5. Addendum # \_\_\_\_\_ Dated \_\_\_\_\_.

**1.11 BIDDER DATA AND SIGNATURE(S)**

A. Name of Firm (*please print*): \_\_\_\_\_

B. Mailing Address: \_\_\_\_\_

C. Physical Address (*if different*): \_\_\_\_\_

D. Construction Contractor Board Registration Number: \_\_\_\_\_

E. Telephone Number: \_\_\_\_\_

F. Email Address: \_\_\_\_\_

G. Signature (*if bid is by a partnership, one of the partners must sign*):

\_\_\_\_\_

H. Name and Official Capacity of Signatory (*please print*):

\_\_\_\_\_

I. If Corporation, Attest (*Secretary of Corporation*):

\_\_\_\_\_

J. SEAL (if Corporation):

**END OF BID FORM**



### FIRST-TIER SUBCONTRACTOR DISCLOSURE

PROJECT NAME: Coquille Public Library Building - Renovation and Addition

PROJECT#: 22.37

BID CLOSING: Date: Aug. 17, 2023 Time: 2 p.m.

This form must be submitted at the location specified in the Invitation to Bid on the advertised bid closing date and within two working hours after the advertised bid closing time.

List below the name of each subcontractor that will be furnishing labor or will be furnishing labor and materials and that is required to be disclosed, the category of work that the subcontractor will be performing and the dollar value of the subcontract. Enter "NONE" if there are no subcontractors that need to be disclosed. (ATTACH ADDITIONAL SHEETS IF NEEDED.)

NAME	DOLLAR VALUE	CATEGORY OF WORK
(1)	\$	
(2)	\$	
(3)	\$	
(4)	\$	
(5)	\$	
(6)	\$	
(7)	\$	
(8)	\$	
(9)	\$	

Failure to submit this form by the disclosure deadline will result in a non-responsive bid. A non-responsive bid will not be considered for award.

Form submitted by (bidder name): \_\_\_\_\_

Contact name: \_\_\_\_\_ Phone no.: ( ) \_\_\_\_\_

**ORS 279C.370 First-tier subcontractor disclosure.** (1)(a) Within two working hours after the date and time of the deadline when bids are due to a contracting agency for a public improvement contract, a bidder shall submit to the contracting agency a disclosure of the first-tier subcontractors that:

- (A) Will be furnishing labor or will be furnishing labor and materials in connection with the public improvement contract; and
- (B) Will have a contract value that is equal to or greater than five percent of the total project bid or \$15,000, whichever is greater, or \$350,000 regardless of the percentage of the total project bid.
  - (b) For each contract to which this subsection applies, the contracting agency shall designate a deadline for submission of bids that has a date on a Tuesday, Wednesday or Thursday and a time between 2 p.m. and 5 p.m., except that this paragraph does not apply to public contracts for maintenance or construction of highways, bridges or other transportation facilities.
  - (c) This subsection applies only to public improvement contracts ("**projects**") with a value, estimated by the contracting agency, of more than **\$100,000**.
  - (d) This subsection does not apply to public improvement contracts that have been exempted from competitive bidding requirements under ORS 279C.335 (2).
- (2) The disclosure of first-tier subcontractors under subsection (1) of this section must include the name of each subcontractor, the category of work that each subcontractor will perform and the dollar value of each subcontract. The information shall be disclosed in substantially the following [above] form:
- (3) A contracting agency shall accept the subcontractor disclosure. The contracting agency shall consider the bid of any contractor that does not submit a subcontractor disclosure to the contracting agency to be a non-responsive bid and may not award the contract to the contractor. A contracting agency is not required to determine the accuracy or the completeness of the subcontractor disclosure.
- (4) After the bids are opened, the subcontractor disclosures must be made available for public inspection.
- (5) A contractor may substitute a first-tier subcontractor under the provisions of ORS 279C.585.
- (6) A subcontractor may file a complaint under ORS 279C.590 based on the disclosure requirements of subsection (1) of this section.

BLANK PAGE

**SECTION 00-7200  
GENERAL CONDITIONS**

**FORM OF GENERAL CONDITIONS**

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

- A. AIA Document A201-2017, General Conditions of the Contract for Constuction.

**RELATED REQUIREMENTS**

**2.01 SECTION 00-7300 - SUPPLEMENTARY CONDITIONS.**

**SUPPLEMENTARY CONDITIONS**

**3.01 REFER TO DOCUMENT 00-7300 - SUPPLEMENTARY CONDITIONS FOR AMENDMENTS TO THESE GENERAL CONDITIONS.**

**END OF SECTION**

BLANK PAGE





# AIA® Document A201® – 2017

## General Conditions of the Contract for Construction

for the following PROJECT:

*(Name and location or address)*

22.37 City of Coquille - Coquille Public Library Building Renovation

**THE OWNER:**

*(Name, legal status and address)*

City of Coquille  
851 N. Central Blvd.  
Coquille, OR 97420

**THE ARCHITECT:**

*(Name, legal status and address)*

HGE ARCHITECTS, Inc.  
333 South 4th Street  
Coos Bay, OR 97420

### TABLE OF ARTICLES

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

### ADDITIONS AND DELETIONS:

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

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

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

14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES

Init.

---

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 14:38:51 ET on 04/17/2023 under Order No.4104239522 which expires on 01/31/2024, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail [docinfo@aiacontracts.com](mailto:docinfo@aiacontracts.com).

User Notes:

(1750099271)

## INDEX

(Topics and numbers in bold are Section headings.)

### Acceptance of Nonconforming Work

9.6.6, 9.9.3, **12.3**

### Acceptance of Work

9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, **12.3**

### Access to Work

**3.16**, 6.2.1, 12.1

### Accident Prevention

10

### Acts and Omissions

3.2, 3.3.2, 3.12.8, 3.18, 4.2.3, 8.3.1, 9.5.1, 10.2.5, 10.2.8, 13.3.2, 14.1, 15.1.2, 15.2

### Addenda

1.1.1

### Additional Costs, Claims for

3.7.4, 3.7.5, 10.3.2, 15.1.5

### Additional Inspections and Testing

9.4.2, 9.8.3, 12.2.1, **13.4**

### Additional Time, Claims for

3.2.4, 3.7.4, 3.7.5, 3.10.2, 8.3.2, **15.1.6**

### Administration of the Contract

3.1.3, **4.2**, 9.4, 9.5

### Advertisement or Invitation to Bid

1.1.1

### Aesthetic Effect

4.2.13

### Allowances

**3.8**

### Applications for Payment

4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5.1, 9.5.4, 9.6.3, 9.7, 9.10

### Approvals

2.1.1, 2.3.1, 2.5, 3.1.3, 3.10.2, 3.12.8, 3.12.9, 3.12.10.1, 4.2.7, 9.3.2, 13.4.1

### Arbitration

8.3.1, 15.3.2, **15.4**

## ARCHITECT

**4**

### Architect, Definition of

**4.1.1**

### Architect, Extent of Authority

2.5, 3.12.7, 4.1.2, 4.2, 5.2, 6.3, 7.1.2, 7.3.4, 7.4, 9.2, 9.3.1, 9.4, 9.5, 9.6.3, 9.8, 9.10.1, 9.10.3, 12.1, 12.2.1, 13.4.1, 13.4.2, 14.2.2, 14.2.4, 15.1.4, 15.2.1

### Architect, Limitations of Authority and Responsibility

2.1.1, 3.12.4, 3.12.8, 3.12.10, 4.1.2, 4.2.1, 4.2.2, 4.2.3, 4.2.6, 4.2.7, 4.2.10, 4.2.12, 4.2.13, 5.2.1, 7.4, 9.4.2, 9.5.4, 9.6.4, 15.1.4, 15.2

### Architect's Additional Services and Expenses

2.5, 12.2.1, 13.4.2, 13.4.3, 14.2.4

### Architect's Administration of the Contract

3.1.3, 3.7.4, 15.2, 9.4.1, 9.5

### Architect's Approvals

2.5, 3.1.3, 3.5, 3.10.2, 4.2.7

### Architect's Authority to Reject Work

3.5, 4.2.6, 12.1.2, 12.2.1

### Architect's Copyright

1.1.7, 1.5

### Architect's Decisions

3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.2.14, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4.1, 9.5, 9.8.4, 9.9.1, 13.4.2, 15.2

### Architect's Inspections

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 13.4

### Architect's Instructions

3.2.4, 3.3.1, 4.2.6, 4.2.7, 13.4.2

### Architect's Interpretations

4.2.11, 4.2.12

### Architect's Project Representative

4.2.10

### Architect's Relationship with Contractor

1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5, 3.7.4, 3.7.5, 3.9.2, 3.9.3, 3.10, 3.11, 3.12, 3.16, 3.18, 4.1.2, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.3.2, 13.4, 15.2

### Architect's Relationship with Subcontractors

1.1.2, 4.2.3, 4.2.4, 4.2.6, 9.6.3, 9.6.4, 11.3

### Architect's Representations

9.4.2, 9.5.1, 9.10.1

### Architect's Site Visits

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4

### Asbestos

10.3.1

### Attorneys' Fees

3.18.1, 9.6.8, 9.10.2, 10.3.3

### Award of Separate Contracts

6.1.1, 6.1.2

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

**5.2**

## Basic Definitions

**1.1**

### Bidding Requirements

1.1.1

### Binding Dispute Resolution

8.3.1, 9.7, 11.5, 13.1, 15.1.2, 15.1.3, 15.2.1, 15.2.5, 15.2.6.1, 15.3.1, 15.3.2, 15.3.3, 15.4.1

### Bonds, Lien

7.3.4.4, 9.6.8, 9.10.2, 9.10.3

### Bonds, Performance, and Payment

7.3.4.4, 9.6.7, 9.10.3, **11.1.2**, 11.1.3, **11.5**

### Building Information Models Use and Reliance

**1.8**

### Building Permit

3.7.1

## Capitalization

**1.3**

### Certificate of Substantial Completion

9.8.3, 9.8.4, 9.8.5

**Certificates for Payment**  
4.2.1, 4.2.5, 4.2.9, 9.3.3, 9.4, 9.5, 9.6.1, 9.6.6, 9.7,  
9.10.1, 9.10.3, 14.1.1.3, 14.2.4, 15.1.4  
**Certificates of Inspection, Testing or Approval**  
13.4.4  
**Certificates of Insurance**  
9.10.2  
**Change Orders**  
1.1.1, 3.4.2, 3.7.4, 3.8.2.3, 3.11, 3.12.8, 4.2.8, 5.2.3,  
7.1.2, 7.1.3, 7.2, 7.3.2, 7.3.7, 7.3.9, 7.3.10, 8.3.1,  
9.3.1.1, 9.10.3, 10.3.2, 11.2, 11.5, 12.1.2  
**Change Orders, Definition of**  
7.2.1  
**CHANGES IN THE WORK**  
2.2.2, 3.11, 4.2.8, 7, 7.2.1, 7.3.1, 7.4, 8.3.1, 9.3.1.1,  
11.5  
**Claims, Definition of**  
15.1.1  
**Claims, Notice of**  
1.6.2, 15.1.3  
**CLAIMS AND DISPUTES**  
3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 9.10.4, 10.3.3, 15, 15.4  
**Claims and Timely Assertion of Claims**  
15.4.1  
**Claims for Additional Cost**  
3.2.4, 3.3.1, 3.7.4, 7.3.9, 9.5.2, 10.2.5, 10.3.2, 15.1.5  
**Claims for Additional Time**  
3.2.4, 3.3.1, 3.7.4, 6.1.1, 8.3.2, 9.5.2, 10.3.2, 15.1.6  
**Concealed or Unknown Conditions, Claims for**  
3.7.4  
**Claims for Damages**  
3.2.4, 3.18, 8.3.3, 9.5.1, 9.6.7, 10.2.5, 10.3.3, 11.3,  
11.3.2, 14.2.4, 15.1.7  
**Claims Subject to Arbitration**  
15.4.1  
**Cleaning Up**  
3.15, 6.3  
**Commencement of the Work, Conditions Relating to**  
2.2.1, 3.2.2, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 5.2.1, 5.2.3,  
6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.2, 15.1.5  
**Commencement of the Work, Definition of**  
8.1.2  
**Communications**  
3.9.1, 4.2.4  
**Completion, Conditions Relating to**  
3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1,  
9.10, 12.2, 14.1.2, 15.1.2  
**COMPLETION, PAYMENTS AND**  
9  
**Completion, Substantial**  
3.10.1, 4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1,  
9.10.3, 12.2, 15.1.2  
**Compliance with Laws**  
2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 10.2.2, 13.1,  
13.3, 13.4.1, 13.4.2, 13.5, 14.1.1, 14.2.1.3, 15.2.8,  
15.4.2, 15.4.3

**Concealed or Unknown Conditions**  
3.7.4, 4.2.8, 8.3.1, 10.3  
**Conditions of the Contract**  
1.1.1, 6.1.1, 6.1.4  
**Consent, Written**  
3.4.2, 3.14.2, 4.1.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 13.2,  
15.4.4.2  
**Consolidation or Joinder**  
15.4.4  
**CONSTRUCTION BY OWNER OR BY  
SEPARATE CONTRACTORS**  
1.1.4, 6  
**Construction Change Directive, Definition of**  
7.3.1  
**Construction Change Directives**  
1.1.1, 3.4.2, 3.11, 3.12.8, 4.2.8, 7.1.1, 7.1.2, 7.1.3, 7.3,  
9.3.1.1  
**Construction Schedules, Contractor's**  
3.10, 3.11, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2  
**Contingent Assignment of Subcontracts**  
5.4, 14.2.2.2  
**Continuing Contract Performance**  
15.1.4  
**Contract, Definition of**  
1.1.2  
**CONTRACT, TERMINATION OR  
SUSPENSION OF THE**  
5.4.1.1, 5.4.2, 11.5, 14  
**Contract Administration**  
3.1.3, 4, 9.4, 9.5  
**Contract Award and Execution, Conditions Relating  
to**  
3.7.1, 3.10, 5.2, 6.1  
**Contract Documents, Copies Furnished and Use of**  
1.5.2, 2.3.6, 5.3  
**Contract Documents, Definition of**  
1.1.1  
**Contract Sum**  
2.2.2, 2.2.4, 3.7.4, 3.7.5, 3.8, 3.10.2, 5.2.3, 7.3, 7.4,  
9.1, 9.2, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.5, 12.1.2,  
12.3, 14.2.4, 14.3.2, 15.1.4.2, 15.1.5, 15.2.5  
**Contract Sum, Definition of**  
9.1  
**Contract Time**  
1.1.4, 2.2.1, 2.2.2, 3.7.4, 3.7.5, 3.10.2, 5.2.3, 6.1.5,  
7.2.1.3, 7.3.1, 7.3.5, 7.3.6, 7, 7, 7.3.10, 7.4, 8.1.1,  
8.2.1, 8.2.3, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 12.1.2,  
14.3.2, 15.1.4.2, 15.1.6.1, 15.2.5  
**Contract Time, Definition of**  
8.1.1  
**CONTRACTOR**  
3  
**Contractor, Definition of**  
3.1, 6.1.2  
**Contractor's Construction and Submittal  
Schedules**  
3.10, 3.12.1, 3.12.2, 4.2.3, 6.1.3, 15.1.6.2

Contractor's Employees  
2.2.4, 3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3, 11.3, 14.1, 14.2.1.1

**Contractor's Liability Insurance**  
**11.1**  
Contractor's Relationship with Separate Contractors and Owner's Forces  
3.12.5, 3.14.2, 4.2.4, 6, 11.3, 12.2.4  
Contractor's Relationship with Subcontractors  
1.2.2, 2.2.4, 3.3.2, 3.18.1, 3.18.2, 4.2.4, 5, 9.6.2, 9.6.7, 9.10.2, 11.2, 11.3, 11.4  
Contractor's Relationship with the Architect  
1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5.1, 3.7.4, 3.10, 3.11, 3.12, 3.16, 3.18, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.4, 15.1.3, 15.2.1  
Contractor's Representations  
3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2  
Contractor's Responsibility for Those Performing the Work  
3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8  
Contractor's Review of Contract Documents  
3.2  
Contractor's Right to Stop the Work  
2.2.2, 9.7  
Contractor's Right to Terminate the Contract  
14.1  
Contractor's Submittals  
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 9.2, 9.3, 9.8.2, 9.8.3, 9.9.1, 9.10.2, 9.10.3  
Contractor's Superintendent  
3.9, 10.2.6  
Contractor's Supervision and Construction Procedures  
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 7.3.6, 8.2, 10, 12, 14, 15.1.4  
Coordination and Correlation  
1.2, 3.2.1, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1  
Copies Furnished of Drawings and Specifications  
1.5, 2.3.6, 3.11  
Copyrights  
1.5, **3.17**  
Correction of Work  
2.5, 3.7.3, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, **12.2**, 12.3, 15.1.3.1, 15.1.3.2, 15.2.1  
**Correlation and Intent of the Contract Documents**  
**1.2**  
**Cost, Definition of**  
**7.3.4**  
Costs  
2.5, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3, 7.3.3.3, 7.3.4, 7.3.8, 7.3.9, 9.10.2, 10.3.2, 10.3.6, 11.2, 12.1.2, 12.2.1, 12.2.4, 13.4, 14  
**Cutting and Patching**  
**3.14, 6.2.5**

Damage to Construction of Owner or Separate Contractors  
3.14.2, 6.2.4, 10.2.1.2, 10.2.5, 10.4, 12.2.4  
Damage to the Work  
3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 12.2.4  
Damages, Claims for  
3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.3.2, 11.3, 14.2.4, 15.1.7  
Damages for Delay  
6.2.3, 8.3.3, 9.5.1.6, 9.7, 10.3.2, 14.3.2  
**Date of Commencement of the Work, Definition of**  
**8.1.2**  
**Date of Substantial Completion, Definition of**  
**8.1.3**  
**Day, Definition of**  
**8.1.4**  
Decisions of the Architect  
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5.1, 9.8.4, 9.9.1, 13.4.2, 14.2.2, 14.2.4, 15.1, 15.2  
**Decisions to Withhold Certification**  
9.4.1, **9.5**, 9.7, 14.1.1.3  
Defective or Nonconforming Work, Acceptance, Rejection and Correction of  
2.5, 3.5, 4.2.6, 6.2.3, 9.5.1, 9.5.3, 9.6.6, 9.8.2, 9.9.3, 9.10.4, 12.2.1  
Definitions  
1.1, 2.1.1, 3.1.1, 3.5, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 5.1, 6.1.2, 7.2.1, 7.3.1, 8.1, 9.1, 9.8.1, 15.1.1  
**Delays and Extensions of Time**  
**3.2, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, 8.3, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5**  
**Digital Data Use and Transmission**  
**1.7**  
Disputes  
6.3, 7.3.9, 15.1, 15.2  
**Documents and Samples at the Site**  
**3.11**  
**Drawings, Definition of**  
**1.1.5**  
Drawings and Specifications, Use and Ownership of  
3.11  
Effective Date of Insurance  
8.2.2  
**Emergencies**  
**10.4, 14.1.1.2, 15.1.5**  
Employees, Contractor's  
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3.3, 11.3, 14.1, 14.2.1.1  
Equipment, Labor, or Materials  
1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2  
Execution and Progress of the Work  
1.1.3, 1.2.1, 1.2.2, 2.3.4, 2.3.6, 3.1, 3.3.1, 3.4.1, 3.7.1, 3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.6, 8.2, 9.5.1, 9.9.1, 10.2, 10.3, 12.1, 12.2, 14.2, 14.3.1, 15.1.4

Extensions of Time  
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3, 7.4, 9.5.1, 9.7, 10.3.2,  
10.4, 14.3, 15.1.6, 15.2.5

**Failure of Payment**  
9.5.1.3, 9.7, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2

Faulty Work  
(See Defective or Nonconforming Work)

**Final Completion and Final Payment**  
4.2.1, 4.2.9, 9.8.2, 9.10, 12.3, 14.2.4, 14.4.3

Financial Arrangements, Owner's  
2.2.1, 13.2.2, 14.1.1.4

**GENERAL PROVISIONS**

**1**

**Governing Law**

**13.1**  
Guarantees (See Warranty)

**Hazardous Materials and Substances**  
10.2.4, 10.3

Identification of Subcontractors and Suppliers  
5.2.1

**Indemnification**  
3.17, 3.18, 9.6.8, 9.10.2, 10.3.3, 11.3

**Information and Services Required of the Owner**  
2.1.2, 2.2, 2.3, 3.2.2, 3.12.10.1, 6.1.3, 6.1.4, 6.2.5,  
9.6.1, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2,  
14.1.1.4, 14.1.4, 15.1.4

**Initial Decision**  
15.2

**Initial Decision Maker, Definition of**  
1.1.8

Initial Decision Maker, Decisions  
14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5

Initial Decision Maker, Extent of Authority  
14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5

**Injury or Damage to Person or Property**  
10.2.8, 10.4

Inspections  
3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3,  
9.9.2, 9.10.1, 12.2.1, 13.4

Instructions to Bidders  
1.1.1

Instructions to the Contractor  
3.2.4, 3.3.1, 3.8.1, 5.2.1, 7, 8.2.2, 12, 13.4.2

**Instruments of Service, Definition of**  
1.1.7

Insurance  
6.1.1, 7.3.4, 8.2.2, 9.3.2, 9.8.4, 9.9.1, 9.10.2, 10.2.5, 11

Insurance, Notice of Cancellation or Expiration  
11.1.4, 11.2.3

**Insurance, Contractor's Liability**  
11.1

Insurance, Effective Date of  
8.2.2, 14.4.2

**Insurance, Owner's Liability**  
11.2

**Insurance, Property**  
10.2.5, 11.2, 11.4, 11.5

Insurance, Stored Materials  
9.3.2

**INSURANCE AND BONDS**

**11**  
Insurance Companies, Consent to Partial Occupancy  
9.9.1

Insured loss, Adjustment and Settlement of  
11.5

Intent of the Contract Documents  
1.2.1, 4.2.7, 4.2.12, 4.2.13

**Interest**  
13.5

**Interpretation**  
1.1.8, 1.2.3, 1.4, 4.1.1, 5.1, 6.1.2, 15.1.1

Interpretations, Written  
4.2.11, 4.2.12

Judgment on Final Award  
15.4.2

**Labor and Materials, Equipment**  
1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,  
5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1,  
10.2.4, 14.2.1.1, 14.2.1.2

Labor Disputes  
8.3.1

Laws and Regulations  
1.5, 2.3.2, 3.2.3, 3.2.4, 3.6, 3.7, 3.12.10, 3.13, 9.6.4,  
9.9.1, 10.2.2, 13.1, 13.3.1, 13.4.2, 13.5, 14, 15.2.8,  
15.4

Liens  
2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8

Limitations, Statutes of  
12.2.5, 15.1.2, 15.4.1.1

Limitations of Liability  
3.2.2, 3.5, 3.12.10, 3.12.10.1, 3.17, 3.18.1, 4.2.6,  
4.2.7, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 9.6.8, 10.2.5, 10.3.3,  
11.3, 12.2.5, 13.3.1

Limitations of Time  
2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7,  
5.2, 5.3, 5.4.1, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3,  
9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15,  
15.1.2, 15.1.3, 15.1.5

**Materials, Hazardous**  
10.2.4, 10.3

Materials, Labor, Equipment and  
1.1.3, 1.1.6, 3.4.1, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,  
5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2,  
10.2.1.2, 10.2.4, 14.2.1.1, 14.2.1.2

Means, Methods, Techniques, Sequences and  
Procedures of Construction  
3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.4.2

Mechanic's Lien  
2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8

**Mediation**  
8.3.1, 15.1.3.2, 15.2.1, 15.2.5, 15.2.6, 15.3, 15.4.1,  
15.4.1.1

**Minor Changes in the Work**  
1.1.1, 3.4.2, 3.12.8, 4.2.8, 7.1, 7.4

## MISCELLANEOUS PROVISIONS

### 13

#### Modifications, Definition of

##### 1.1.1

#### Modifications to the Contract

1.1.1, 1.1.2, 2.5, 3.11, 4.1.2, 4.2.1, 5.2.3, 7, 8.3.1, 9.7, 10.3.2

#### Mutual Responsibility

### 6.2

#### Nonconforming Work, Acceptance of

9.6.6, 9.9.3, 12.3

#### Nonconforming Work, Rejection and Correction of

2.4, 2.5, 3.5, 4.2.6, 6.2.4, 9.5.1, 9.8.2, 9.9.3, 9.10.4, 12.2

#### Notice

1.6, 1.6.1, 1.6.2, 2.1.2, 2.2.2., 2.2.3, 2.2.4, 2.5, 3.2.4, 3.3.1, 3.7.4, 3.7.5, 3.9.2, 3.12.9, 3.12.10, 5.2.1, 7.4, 8.2.2, 9.6.8, 9.7, 9.10.1, 10.2.8, 10.3.2, 11.5, 12.2.2.1, 13.4.1, 13.4.2, 14.1, 14.2.2, 14.4.2, 15.1.3, 15.1.5, 15.1.6, 15.4.1

#### Notice of Cancellation or Expiration of Insurance

11.1.4, 11.2.3

#### Notice of Claims

1.6.2, 2.1.2, 3.7.4, 9.6.8, 10.2.8, 15.1.3, 15.1.5, 15.1.6, 15.2.8, 15.3.2, 15.4.1

#### Notice of Testing and Inspections

13.4.1, 13.4.2

#### Observations, Contractor's

3.2, 3.7.4

#### Occupancy

2.3.1, 9.6.6, 9.8

#### Orders, Written

1.1.1, 2.4, 3.9.2, 7, 8.2.2, 11.5, 12.1, 12.2.2.1, 13.4.2, 14.3.1

## OWNER

### 2

#### Owner, Definition of

##### 2.1.1

#### Owner, Evidence of Financial Arrangements

2.2, 13.2.2, 14.1.1.4

#### Owner, Information and Services Required of the

2.1.2, 2.2, 2.3, 3.2.2, 3.12.10, 6.1.3, 6.1.4, 6.2.5, 9.3.2, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2, 14.1.1.4, 14.1.4, 15.1.4

#### Owner's Authority

1.5, 2.1.1, 2.3.2.4, 2.5, 3.4.2, 3.8.1, 3.12.10, 3.14.2, 4.1.2, 4.2.4, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2.1, 7.3.1, 8.2.2, 8.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2, 10.3.2, 11.4, 11.5, 12.2.2, 12.3, 13.2.2, 14.3, 14.4, 15.2.7

#### Owner's Insurance

### 11.2

#### Owner's Relationship with Subcontractors

1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2

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

2.5, 14.2.2

#### Owner's Right to Clean Up

### 6.3

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

### 6.1

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

### 2.4

#### Owner's Right to Suspend the Work

14.3

#### Owner's Right to Terminate the Contract

14.2, 14.4

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

1.1.1, 1.1.6, 1.1.7, 1.5, 2.3.6, 3.2.2, 3.11, 3.17, 4.2.12, 5.3

#### Partial Occupancy or Use

9.6.6, 9.9

#### Patching, Cutting and

3.14, 6.2.5

#### Patents

3.17

#### Payment, Applications for

4.2.5, 7.3.9, 9.2, 9.3, 9.4, 9.5, 9.6.3, 9.7, 9.8.5, 9.10.1, 14.2.3, 14.2.4, 14.4.3

#### Payment, Certificates for

4.2.5, 4.2.9, 9.3.3, 9.4, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4

#### Payment, Failure of

9.5.1.3, 9.7, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2

#### Payment, Final

4.2.1, 4.2.9, 9.10, 12.3, 14.2.4, 14.4.3

#### Payment Bond, Performance Bond and

7.3.4.4, 9.6.7, 9.10.3, 11.1.2

#### Payments, Progress

9.3, 9.6, 9.8.5, 9.10.3, 14.2.3, 15.1.4

## PAYMENTS AND COMPLETION

### 9

#### Payments to Subcontractors

5.4.2, 9.5.1.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7, 14.2.1.2

#### PCB

10.3.1

#### Performance Bond and Payment Bond

7.3.4.4, 9.6.7, 9.10.3, 11.1.2

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

2.3.1, 3.7, 3.13, 7.3.4.4, 10.2.2

## PERSONS AND PROPERTY, PROTECTION OF

### 10

#### Polychlorinated Biphenyl

10.3.1

#### Product Data, Definition of

3.12.2

#### Product Data and Samples, Shop Drawings

3.11, 3.12, 4.2.7

#### Progress and Completion

4.2.2, 8.2, 9.8, 9.9.1, 14.1.4, 15.1.4

#### Progress Payments

9.3, 9.6, 9.8.5, 9.10.3, 14.2.3, 15.1.4

Init.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 14:38:51 ET on 04/17/2023 under Order No.4104239522 which expires on 01/31/2024, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.

User Notes:

(1750099271)

**Project, Definition of**  
**1.1.4**  
 Project Representatives  
 4.2.10  
**Property Insurance**  
 10.2.5, 11.2  
**Proposal Requirements**  
 1.1.1  
**PROTECTION OF PERSONS AND PROPERTY**  
**10**  
 Regulations and Laws  
 1.5, 2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1,  
 10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14, 15.2.8, 15.4  
 Rejection of Work  
 4.2.6, 12.2.1  
 Releases and Waivers of Liens  
 9.3.1, 9.10.2  
 Representations  
 3.2.1, 3.5, 3.12.6, 8.2.1, 9.3.3, 9.4.2, 9.5.1, 9.10.1  
 Representatives  
 2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.10, 13.2.1  
 Responsibility for Those Performing the Work  
 3.3.2, 3.18, 4.2.2, 4.2.3, 5.3, 6.1.3, 6.2, 6.3, 9.5.1, 10  
 Retainage  
 9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3  
**Review of Contract Documents and Field**  
**Conditions by Contractor**  
 3.2, 3.12.7, 6.1.3  
 Review of Contractor's Submittals by Owner and  
 Architect  
 3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 6.1.3, 9.2, 9.8.2  
 Review of Shop Drawings, Product Data and Samples  
 by Contractor  
 3.12  
**Rights and Remedies**  
 1.1.2, 2.4, 2.5, 3.5, 3.7.4, 3.15.2, 4.2.6, 5.3, 5.4, 6.1,  
 6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.1, 12.2.2,  
 12.2.4, 13.3, 14, 15.4  
**Royalties, Patents and Copyrights**  
 3.17  
 Rules and Notices for Arbitration  
 15.4.1  
**Safety of Persons and Property**  
 10.2, 10.4  
**Safety Precautions and Programs**  
 3.3.1, 4.2.2, 4.2.7, 5.3, 10.1, 10.2, 10.4  
**Samples, Definition of**  
 3.12.3  
**Samples, Shop Drawings, Product Data and**  
 3.11, 3.12, 4.2.7  
**Samples at the Site, Documents and**  
 3.11  
**Schedule of Values**  
 9.2, 9.3.1  
 Schedules, Construction  
 3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2

Separate Contracts and Contractors  
 1.1.4, 3.12.5, 3.14.2, 4.2.4, 4.2.7, 6, 8.3.1, 12.1.2  
**Separate Contractors, Definition of**  
**6.1.1**  
**Shop Drawings, Definition of**  
**3.12.1**  
**Shop Drawings, Product Data and Samples**  
 3.11, 3.12, 4.2.7  
**Site, Use of**  
 3.13, 6.1.1, 6.2.1  
 Site Inspections  
 3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2, 9.9.2, 9.4.2, 9.10.1, 13.4  
 Site Visits, Architect's  
 3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4  
 Special Inspections and Testing  
 4.2.6, 12.2.1, 13.4  
**Specifications, Definition of**  
**1.1.6**  
**Specifications**  
 1.1.1, 1.1.6, 1.2.2, 1.5, 3.12.10, 3.17, 4.2.14  
 Statute of Limitations  
 15.1.2, 15.4.1.1  
 Stopping the Work  
 2.2.2, 2.4, 9.7, 10.3, 14.1  
 Stored Materials  
 6.2.1, 9.3.2, 10.2.1.2, 10.2.4  
**Subcontractor, Definition of**  
**5.1.1**  
**SUBCONTRACTORS**  
**5**  
 Subcontractors, Work by  
 1.2.2, 3.3.2, 3.12.1, 3.18, 4.2.3, 5.2.3, 5.3, 5.4, 9.3.1.2,  
 9.6.7  
**Subcontractual Relations**  
 5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1, 14.1, 14.2.1  
 Submittals  
 3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.4, 9.2, 9.3, 9.8,  
 9.9.1, 9.10.2, 9.10.3  
 Submittal Schedule  
 3.10.2, 3.12.5, 4.2.7  
**Subrogation, Waivers of**  
 6.1.1, 11.3  
**Substances, Hazardous**  
**10.3**  
**Substantial Completion**  
 4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3, 12.2,  
 15.1.2  
**Substantial Completion, Definition of**  
**9.8.1**  
 Substitution of Subcontractors  
 5.2.3, 5.2.4  
 Substitution of Architect  
 2.3.3  
 Substitutions of Materials  
 3.4.2, 3.5, 7.3.8  
**Sub-subcontractor, Definition of**  
**5.1.2**

Init.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 14:38:51 ET on 04/17/2023 under Order No.4104239522 which expires on 01/31/2024, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.

User Notes:

(1750099271)



Subsurface Conditions  
3.7.4

**Successors and Assigns**  
13.2

**Superintendent**  
3.9, 10.2.6

**Supervision and Construction Procedures**  
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 8.2, 8.3.1, 9.4.2, 10, 12, 14, 15.1.4

Suppliers  
1.5, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.5.4, 9.6, 9.10.5, 14.2.1

Surety  
5.4.1.2, 9.6.8, 9.8.5, 9.10.2, 9.10.3, 11.1.2, 14.2.2, 15.2.7

Surety, Consent of  
9.8.5, 9.10.2, 9.10.3

Surveys  
1.1.7, 2.3.4

**Suspension by the Owner for Convenience**  
14.3

Suspension of the Work  
3.7.5, 5.4.2, 14.3

Suspension or Termination of the Contract  
5.4.1.1, 14

**Taxes**  
3.6, 3.8.2.1, 7.3.4.4

**Termination by the Contractor**  
14.1, 15.1.7

**Termination by the Owner for Cause**  
5.4.1.1, 14.2, 15.1.7

**Termination by the Owner for Convenience**  
14.4

Termination of the Architect  
2.3.3

Termination of the Contractor Employment  
14.2.2

**TERMINATION OR SUSPENSION OF THE CONTRACT**

14

**Tests and Inspections**

3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 10.3.2, 12.2.1, 13.4

**TIME**

8

**Time, Delays and Extensions of**

3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, 8.3, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5

**Time Limits**

2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2, 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15.1.2, 15.1.3, 15.4

**Time Limits on Claims**

3.7.4, 10.2.8, 15.1.2, 15.1.3

**Title to Work**

9.3.2, 9.3.3

**UNCOVERING AND CORRECTION OF WORK**  
12

**Uncovering of Work**

12.1

**Unforeseen Conditions, Concealed or Unknown**

3.7.4, 8.3.1, 10.3

**Unit Prices**

7.3.3.2, 9.1.2

**Use of Documents**

1.1.1, 1.5, 2.3.6, 3.12.6, 5.3

**Use of Site**

3.13, 6.1.1, 6.2.1

**Values, Schedule of**

9.2, 9.3.1

**Waiver of Claims by the Architect**

13.3.2

**Waiver of Claims by the Contractor**

9.10.5, 13.3.2, 15.1.7

**Waiver of Claims by the Owner**

9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.3.2, 14.2.4, 15.1.7

**Waiver of Consequential Damages**

14.2.4, 15.1.7

**Waiver of Liens**

9.3, 9.10.2, 9.10.4

**Waivers of Subrogation**

6.1.1, 11.3

**Warranty**

3.5, 4.2.9, 9.3.3, 9.8.4, 9.9.1, 9.10.2, 9.10.4, 12.2.2, 15.1.2

**Weather Delays**

8.3, 15.1.6.2

**Work, Definition of**

1.1.3

**Written Consent**

1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.10.3, 13.2, 13.3.2, 15.4.4.2

**Written Interpretations**

4.2.11, 4.2.12

**Written Orders**

1.1.1, 2.4, 3.9, 7, 8.2.2, 12.1, 12.2, 13.4.2, 14.3.1

## **ARTICLE 1 GENERAL PROVISIONS**

### **§ 1.1 Basic Definitions**

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

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

#### **§ 1.1.2 The Contract**

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

#### **§ 1.1.3 The Work**

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

#### **§ 1.1.4 The Project**

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

#### **§ 1.1.5 The Drawings**

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

#### **§ 1.1.6 The Specifications**

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

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

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

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

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

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

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

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

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

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

### § 1.3 Capitalization

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

### § 1.4 Interpretation

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

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

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

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

### § 1.6 Notice

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

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

### § 1.7 Digital Data Use and Transmission

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

### § 1.8 Building Information Models Use and Reliance

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

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

## ARTICLE 2 OWNER

### § 2.1 General

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

### ARTICLE 3 CONTRACTOR

#### § 3.1 General

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

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

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

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

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

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

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

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

### § 3.3 Supervision and Construction Procedures

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

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

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

### § 3.4 Labor and Materials

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

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

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

### § 3.5 Warranty

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

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

### § 3.6 Taxes

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

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

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

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

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

### § 3.7.4 Concealed or Unknown Conditions

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

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

### § 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

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

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

### § 3.9 Superintendent

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

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

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

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

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

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

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

### § 3.11 Documents and Samples at the Site

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

### § 3.13 Use of Site

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

### § 3.14 Cutting and Patching

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

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

### § 3.15 Cleaning Up

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

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

### § 3.16 Access to Work

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

### § 3.17 Royalties, Patents and Copyrights

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

### § 3.18 Indemnification

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

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

## ARTICLE 4 ARCHITECT

### § 4.1 General

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

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

### § 4.2 Administration of the Contract

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

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

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

### § 4.2.4 Communications

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

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

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

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

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

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

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

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

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

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

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

## ARTICLE 5 SUBCONTRACTORS

### § 5.1 Definitions

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

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

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

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

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

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

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

### § 5.3 Subcontractual Relations

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

### § 5.4 Contingent Assignment of Subcontracts

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

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

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

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

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

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

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

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

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

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

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

### **§ 6.2 Mutual Responsibility**

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

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

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

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

Init.

§ 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

Init.

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

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

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

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

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

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

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

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

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

**§ 10.3 Hazardous Materials and Substances**

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

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

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

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

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

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

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

#### § 10.4 Emergencies

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

### ARTICLE 11 INSURANCE AND BONDS

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

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

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

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

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

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

## § 11.2 Owner's Insurance

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

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

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

## § 11.3 Waivers of Subrogation

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

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

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

Init.

AIA Document A201 – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are registered trademarks of The American Institute of Architects. This document was produced at 14:38:51 ET on 04/17/2023 under Order No.4104239522 which expires on 01/31/2024, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.

User Notes:

(1750099271)



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.

Init.

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

## ARTICLE 15 CLAIMS AND DISPUTES

### § 15.1 Claims

#### § 15.1.1 Definition

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

#### § 15.1.2 Time Limits on Claims

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

#### § 15.1.3 Notice of Claims

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

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

#### § 15.1.4 Continuing Contract Performance

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

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

#### § 15.1.5 Claims for Additional Cost

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

#### § 15.1.6 Claims for Additional Time

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

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

### § 15.1.7 Waiver of Claims for Consequential Damages

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

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

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

### § 15.2 Initial Decision

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

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

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

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

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

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

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

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

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

### § 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

### § 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

**§ 15.4.4 Consolidation or Joinder**

**§ 15.4.4.1** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

**§ 15.4.4.2** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

**§ 15.4.4.3** The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.



**SECTION 00-7300  
SUPPLEMENTARY CONDITIONS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. These Supplementary Conditions amend and supplement the General Conditions, AIA Document A201-2017 General Conditions of the Contract for Construction defined in Document 00 7200 and other provisions of the Contract Documents as indicated below. All provisions that are not so amended or supplemented remain in full force and effect.
- B. The terms used in these Supplementary Conditions that are defined in the General Conditions have the meanings assigned to them in the General Conditions.

**1.02 MODIFICATIONS TO GENERAL CONDITIONS**

A. ARTICLE 1. GENERAL PROVISIONS

- 1. 1.1.1: Revise the first sentence as set forth below:
  - a. The Contract Documents consist of the Conditions of the Contract (General, Supplementary and other Conditions), Contract Forms as bound or referenced, the Drawings, the Specifications, the Details, all Addenda issued prior to execution of the contract and all modifications issued after execution of the Contract.
- 2. 1.2 CORRELATIONS AND INTENT OF THE CONTRACT DOCUMENTS
  - a. 1.2.1 Add the following:
    - 1) If work is required in a manner to make it impossible to produce first class work, or should discrepancies appear among contract documents, request interpretation before proceeding with work. If Contractor fails to make such request, no excuse will thereafter be entertained for failure to carry out work in satisfactory manner.
  - b. 1.2.3: Add the following:
    - 1) Reference to technical society, organization, or body is made in specifications in accordance with the following abbreviations:
      - a) ACI American Concrete Institute
      - b) AIA American Institute of Architects
      - c) AIEE American Institute of Electrical Engineers
      - d) AISC American Institute of Steel Construction
      - e) ASA American Standard Association
      - f) APA American Plywood Association
      - g) ASTM American Society of Testing Materials
      - h) ASME American Society of Mechanical Engineers
      - i) AWI Architectural Woodwork Institute
      - j) AWSC American Welding Society Code
      - k) CS Commercial Standard
      - l) FS Federal Specifications
      - m) IBC International Building Code
      - n) MIL Military Specifications
      - o) NBFU National Board of Fire Underwriters
      - p) NBS National Board of Standards
      - q) NEC National Electric Code
      - r) NEMA National Electrical Manufacturer's Assn.
      - s) NFPA National Fire Protection Association

- t) OSHA Occupational Safety and Health Act
- u) UBC Uniform Building Code
- v) UL Underwriters Laboratory
- w) WCLIB West Coast Lumber Inspection Bureau

B. ARTICLE 2 OWNER

- 1. 2.1.1 Add the following:
  - a. The Owner is defined as City of Coquille.
- 2. 2.3.6 Substitute the following:
  - a. The Owner through the Architect will furnish to the Contractor Six (6) complete sets of drawings and specifications without charge for use on project. These include sets submitted to Agency having jurisdiction for plans review and building permit. Additional copies may be purchased by Contractor at cost of reproduction.

C. ARTICLE 3 CONTRACTOR

- 1. 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES
  - a. 3.3.1 Add the following:
    - 1) The Contractor will supervise and direct the work and will review with all subcontractors methods and materials to be used to verify their compliance with all safety standards and laws and be responsible for compliance with same, to insure safe, hazard free conditions for all persons visiting or working on the entire project.
- 2. 3.7 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS
  - a. 3.7.1 Add:
    - 1) The Owner shall pay for the Building Permit Plan Review and Building Permit fees only. The Contractor shall pay all other permit and plan review fees related to his work and his subcontractors, i.e., plumbing, mechanical and electrical. Owner shall pay any system development fees required.
- 3. 3.11 DOCUMENTS AND SAMPLES AT THE SITE, Add the following:
  - a. Upon completion of the project transfer all information from the record set of drawings to a clean set of prints and deliver to the Architect. Drawing additions are to be added in contrasting ink and are to be accurate, neat and finished in appearance and show accurate horizontal and vertical dimensions for location of underground work. Drawings must be acceptable to Architect before certification of final payment will be made.
- 4. 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES
  - a. 3.12.5 Add the following:
    - 1) See Section 01-3000 - Administrative Requirements for submittal information, requirements, and procedures.
- 5. 3.15 CLEANING UP
  - a. 3.15.1 Add the following:
    - 1) Upon completion of any portion of the work, promptly remove temporary facilities generated by that portion of the work, including surplus materials, equipment, and machinery if so directed by the Architect or the Owner. Upon completion of the Work, completely remove temporary facilities. Remove stains, spots and smears from all surfaces. Remove all labels. Leave the premises in a "broom clean" condition.

D. ARTICLE 4 ARCHITECT

- 1. 4.1.1 Add the following:
  - a. The Architect is defined as HGE Architects, Inc.

E. ARTICLE 5 SUBCONTRACTORS

- 1. 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK
  - a. 5.2.1 Add the following:

- 1) The list of subcontractors shall be submitted no later than five (5) days after the bid opening.

F. ARTICLE 7 CHANGES IN THE WORK

1. 7.2 CHANGE ORDERS

a. 7.2.2 Add the following:

- 1) The cost to the Owner resulting from extra work shall be determined by an agreed price which shall include a percentage for overhead and profit as listed below; or shall be the actual cost of the additional direct labor, materials, and subcontract work involved, plus a percentage for overhead and profit as listed below.
  - a) The percentage shall not exceed 10% to cover both profit and overhead.
- 2) The credit to the Owner resulting from a deduction of work shall be determined by an agreed price, or the actual cost of direct labor, materials, and subcontract work involved.
- 3) Cost and credits shall be submitted by the Contractor to the Architect in a complete breakdown form, showing cost, overhead and profit.
- 4) Cost shall be limited to the following: Cost of products, including taxes and cost of delivery; cost of labor, including social security, old age, and unemployment insurance, and fringe benefits under collective bargaining agreements; Workmen's Compensation Insurance; bond premiums; and rental value of power tools and equipment. Overhead shall include the following: Supervision, superintendence, wages of time keepers, watchmen, and clerks, hand tools, incidentals, general office expense, and all other proven expenses not included in "cost".

G. ARTICLE 8 TIME

1. 8.2 PROGRESS AND COMPLETION

a. 8.2.4 Add the following:

- 1) The Contractor agrees:
- 2) To proceed upon receipt of the executed Contract and the Notice to Proceed.
- 3) It is hereby understood and mutually agreed, by and between the contractor and the Owner, that the date of beginning and the time for completion of each phase of the work to be done are ESSENTIAL CONDITIONS of this contract.
- 4) The Contractor agrees that said work shall be prosecuted regularly, diligently, at such rate of progress as will insure substantial completion thereof within the time specified. It is expressly understood and agree, by and between the Contractor and the Owner that the time for the completion of the work described herein is reasonable taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.
- 5) If said Contractor shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part consideration for the awarding of this Contract, to pay to the Owner, the sum of THREE HUNDRED DOLLARS (\$300), not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every calendar day that the contractor shall be in default after the time stipulated in the contract for substantial completion of the work.
- 6) The said amount is fixed and agreed upon by; and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amount is agreed to be the amount of damages which the Owner would sustain.

H. ARTICLE 9 PAYMENTS AND COMPLETION

1. APPLICATIONS FOR PAYMENT

a. 9.3.1 Add the following:

- 1) Payment request form shall be submitted on AIA G702 Application for Payment supplemented with AIA G703 Continuation Sheet. Forms will be furnished by Architect if requested by Contractor. Contractor may use their own spreadsheet type format, however line items must exactly match AIA line items.

2. PROGRESS PAYMENTS

a. 9.6.1 Amend as follows:

- 1) After the Architect has issued a certificate for payment the Owner will pay the Contractor ninety-five (95%) percent of the value of material and labor worked into the building or stored on the site before the first day of the month less the aggregate of previous payments.
- 2) Payment will be made on or before the fifteenth (15th) day of the month following the date of the application for payment.
- 3) Upon Substantial Completion of the contract the sum sufficient to increase total payment to ninety-five (95%) percent of the contract amount is due. Thirty (30) days thereafter, provided the work then be fully completed and accepted by the Architect, balance under the contract is due.

I. ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

1. 10.2 SAFETY OF PERSONS AND PROPERTY

a. 10.2.2 Add the following:

- 1) Contractors shall comply with all provisions of OAR 437 Division 155 (Hazard Communication). Contractor shall provide Owner, through the Architect, a copy of MSDS (Material Safety Data Sheets) for all chemicals brought onto the site, and shall maintain an inventory on the job site of such chemicals. Such inventory shall be accessible to those who desire access.

J. ARTICLE 11 INSURANCE AND BONDS

1. 11.1 CONTRACTOR'S INSURANCE AND BONDS

a. 11.1.2 Add the following:

- 1) The Contractor's comprehensive general liability insurance and automobile liability insurance shall not be less than the amount shown below:
- 2) Worker's Compensation as required by law.
- 3) Bodily Injury Liability - Automobile:
  - a) Each person \$ 500,000
  - b) Each occurrence \$1,000,000
- 4) Bodily Injury Liability - Except Automobile:
  - a) Each person \$1,000,000
  - b) Each occurrence \$1,000,000
- 5) Property Damage Liability - Automobile:
  - a) Each occurrence \$ 500,000
- 6) Property Damage Liability - Except Automobile:
  - a) Each occurrence \$ 500,000
  - b) Aggregate occurrence \$1,000,000
- 7) The Contractor will either (1) require each of his subcontractors to procure and maintain during the life of his subcontract, subcontractor's comprehensive general liability, automobile liability, and property damage liability insurance of the type and in the same amounts as specified in this subparagraph; or (2) insure the activity of his subcontractors.

- 8) The Contractor, its subcontractors, if any, and all employers working under this Agreement are subject employers under the Oregon Worker's Compensation Law and shall comply with ORS 656.017, which requires them to provide workers' compensation coverage for all their subject workers.
2. 11.1.3.1 Add the following:
    - a. The Contractor is advised that the Owner does not carry "Builder's Risk" Insurance and the Contractor is required to obtain this insurance.
  3. 11.4 PERFORMANCE AND PAYMENT BOND
  4. 11.4.1 Substitute the following:
    - a. The Contractor shall furnish a Performance Bond in an amount equal to one hundred (100%) percent of the contract sum as security for the faithful performance of this contract and also a Labor and Materials Payment Bond in an amount not less than one hundred (100%) percent of the contract sum as security for the payment of all persons performing labor on the project under this contract. Bond shall be written by a company licensed in the State of Oregon and satisfactory to the Owner.
- K. ARTICLE 13 MISCELLANOUS PROVISIONS
1. 13.1 GOVERNING LAW, Add the following:
    - a. General Contractor and each subcontractor to comply with all Federal, State laws pertaining to Social Security, Unemployment Insurance, Tax Regulations. Make prompt payment to designated agencies.
    - b. Contractor agrees to abide by all Federal and State regulations pertaining to the employment of minority and ethnic groups including all required affirmative action, and further agrees to hold owner harmless on account of all duties and responsibilities imposed on Contractor by the terms of any State or Federal Statute, regulation, or other governmental directive.
  2. 13.6 Add the following:
    - a. All labor subject to the provisions of ORS 279C.520 and 279C.830 which is performed under this contract shall be paid not less than the prevailing rate of wage for an hour's work in the same trade or occupation in the locality where such labor is performed.
- L. ADD ARTICLE 16 SUPPLEMENTAL PUBLIC CONTRACTING STATUTES
1. Contractor, subcontractor(s) and all persons doing or contracting to do any work shall comply with all provisions of Oregon Public Contracting Laws and regulations, as further specified below.
  2. Contractor shall pay promptly, as due, all persons supplying labor or materials for the prosecution of the work provided for in the contract, and shall be responsible for such payment of all persons supplying such labor or material to any Subcontractor.
    - a. ORS 279C.580(3)(a) requires the prime contractor to include a clause in each subcontract requiring contractor to pay the first-tier subcontractor for satisfactory performance under its subcontract within ten (10) days out of such amounts as are paid to the prime contractor by the public contracting agency; and
    - b. ORS 279C.580(3)(b) requires the prime contractor to include a clause in each subcontract requiring contractor to pay an interest penalty to the first-tier subcontractor if payment is not made within thirty (30) days after receipt of payment from the public contracting agency.
    - c. ORS 279C.580(4) requires the prime contractor to include in every subcontract a requirement that the payment and interest penalty clauses required by ORS 279C.580(3)(a) and (b) be included in every contract between a subcontractor and a lower-tier subcontractor or supplier.

3. Contractor shall promptly pay all contributions or amounts due the Industrial Accident Fund from such Contractor or Subcontractor incurred in the performance of the contract, and shall be responsible that all sums due the State Unemployment Compensation Fund from Contractor or any Subcontractor in connection with the performance of the contract shall promptly be paid.
4. Contractor shall not permit any lien or claim to be filed or prosecuted against the public contracting agency on account of any labor or material furnished and agrees to assume responsibility for satisfaction of any such lien so filed or prosecuted.
5. A notice of claim on contractor's payment bond shall be submitted only in accordance with ORS 279C.600 and 279C.605.
6. Contractor and any Subcontractor shall pay to the Department of Revenue all sums withheld from employees pursuant to ORS 316.167.
7. Contractor shall demonstrate to the Public Contracting Agency that an employee drug-testing program is in place within ten (10) days of receiving a Notice of Award.
8. If Contractor fails, neglects or refuses to make prompt payment of any claim for labor or materials furnished to the Contractor or a Subcontractor by any person in connection with the contract as such claim becomes due, the public contracting agency may pay such claim to the persons furnishing the labor or material and charge the amount of payment against funds due or to become due Contractor by reason of the contract. The payment of a claim in the manner authorized hereby shall not relieve the Contractor or his surety from his or its obligation with respect to any unpaid claim. If the public contracting agency is unable to determine the validity of any claim for labor or material furnished, the public contracting agency may withhold from any current payment due Contractor an amount equal to said claim until its validity is determined and the claim, if valid, is paid.
9. If the Contractor or a first-tier Subcontractor fails, neglects, or refuses to make payment to a person furnishing labor or materials in connection with the public contract for a public improvement within thirty (30) days after receipt of payment from the public contracting agency or contractor, the contractor or first-tier subcontractor shall owe the person the amount due plus interest charges commencing at the end of the ten (10) day period that payment is due under ORS 279C.580(4) and ending upon final payment, unless payment is subject to a good faith dispute as defined in ORS 279C.580. The rate of interest charged to Contractor or first-tier Subcontractor on the amount due shall equal three times the discount rate on ninety (90) day commercial paper in effect at the Federal Reserve Bank in the Federal Reserve District that includes Oregon on the date that is thirty (30) days after the date when payment was received from the public contracting agency or from the Contractor, but the rate of interest shall not exceed thirty (30) percent. The amount of interest may not be waived.
10. If the Contractor or a Subcontractor fails, neglects, or refuses to make payment to a person furnishing labor or materials in connection with the public contract, the person may file a complaint with the Construction Contractor's Board, unless payment is subject to a good faith dispute as defined in ORS 279C.580.
11. Contractor shall promptly, as due, make payment to any person, co-partnership, association, or corporation, furnishing medical, surgical and hospital care or other needed care and attention, incident to sickness or injury, to employees of such Contractor, or all sums which the Contractor agrees to pay for such services and all monies and sums which the Contractor collected or deducted from the wages of employees pursuant to any law, contract or agreement for the purpose of providing or paying for such service.
12. Contractor shall employ no person for more than ten (10) hours in any one day, or forty (40) hours in any one week, except in cases of necessity, emergency, or where public policy absolutely requires it, and in such cases, except in cases of contracts for personal services designated under ORS 279A.055. Contractor shall pay the employee at least time and one-half pay for all overtime in excess of eight (8) hours a day or forty (40) hours in any one week when the work is five (5) consecutive days, Monday through Friday; or for all overtime in excess of ten (10) hours a day or forty (40) hours in any one week when the work week is four (4) consecutive days, Monday through Friday, and for all work performed on Saturday and on any legal holidays as specified in ORS 279C.540.

13. The Contractor must give notice to employees who work on this contract in writing, either at the time of hire or before commencement of work on the contract, or by posting a notice in a location frequented by employees, of the number of hours per day and the days per week that the employees be required to work.
14. The provisions of ORS 279C. 800 to ORS 279C.870 relating to the prevailing wage rates will be complied with.
15. Unless exempt under ORS 279C.836(4), (7), (8) or (9), before starting work on this contract, or any subcontract hereunder, contractor and all subcontractors must have on file with the Construction Contractors Board a public works bond with a corporate surety authorized to do business in the state of Oregon in the amount of \$30,000. The bond must provide that the contractor or subcontractor will pay claims ordered by the Bureau of Labor and Industries to workers performing labor upon public works projects. The bond must be a continuing obligation, and the surety's liability for the aggregate of claims that may be payable from the bond may not exceed the penal sum of the bond. The bond must remain in effect continuously until depleted by claims paid under any applicable prevailing wage rate laws, unless the surety sooner cancels the bond. Contractor further certifies that contractor will include in every subcontract or provision requiring a subcontractor to have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt under ORS 279C.836(4), (7), (8) or (9).
  - a. Unless exempt under ORS 279C.836(4), (7), (8) or (9), before permitting a subcontractor to start work on this public works project, the contractor shall verify that the subcontractor has filed a public works bond as required under this section or has elected not to file a public works bond under an exemption.
  - b. Unless public contracting agency has been notified of any applicable exemptions under ORS 279C.836(4), (7), (8) or (9), the public works bond requirement above is in addition to any other bond contractors or subcontractors may be required to obtain under this contract.
16. Unless exempt, Contractor or contractor's surety and every subcontractor or subcontractor's surety shall file certified payroll statements with the public contracting agency in writing, pursuant to ORS 279C.845.
  - a. If a contractor is required to file certified statements under ORS 279C.845, the public contracting agency shall retain twenty-five percent (25%) of any amount earned by the contractor on the public works project until the contractor has filed with the public agency certified statement as required by ORS.279C.845. The public contracting agency shall pay the contractor the amount retained within fourteen (14) days after the contractor files the required certified statements, regardless of whether a subcontractor has failed to file certified statements required by statute. The public contracting agency is not required to verify the truth of the contents of certified statements filed by the contractor under this section and ORS 279C.845.
  - b. The contractor shall retain twenty-five percent (25%) of any amount earned by a first-tier subcontractor on this public works contract until the subcontractor has filed with the public agency certified statements as required by ORS 279C.845. The contractor shall verify that the first-tier subcontractor has filed the certified statements before the contractor may pay the subcontractor any amount retained. The contractor shall pay the first-tier subcontractor the amount retained within fourteen (14) days after the subcontractor files the certified statements as required by ORS 279C.845. Neither the public agency nor the contractor is required to verify the truth of the contents of certified statements filed by a first-tier subcontractor.
17. All employers, including Contractor, that employ subject workers who work under this contract shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. Contractor shall ensure that each of its subcontractors complies with these requirements.

18. All sums due the State Unemployment Compensation Fund from the Contractor or any Subcontractor in connection with the performance of the contract shall be promptly so paid.
19. The contract may be canceled at the election of public contracting agency for any willful failure on the part of Contractor to faithfully perform the contract according to its terms.
20. Contractor certifies that it has not discriminated against minorities, women or emerging small business enterprises in obtaining any required subcontractors.
21. Contractor certifies its compliance with the Oregon tax laws, in accordance with ORS 305.385.
22. In the performance of this contract, the Contractor shall use, to the maximum extent economically feasible, recycled paper, materials, and supplies.
23. Contractor certifies that all subcontractors performing construction work under this contract will be licensed with the Construction Contractors Board or licensed by the state Landscaper Contractors Board in accordance with 701.035 to 701.055 before the subcontractors commence work under this contract.
24. In compliance with the provisions of ORS 279C.525, the following is a list of federal, state and local agencies, of which the Owner has knowledge, that have enacted ordinances or regulations dealing with the prevention of environmental pollution and the preservation of natural resources that may affect the performance of the contract:
  - a. FEDERAL AGENCIES
    - 1) Agriculture, Department of
    - 2) Forest Service
    - 3) Soil Conservation Service
    - 4) Defense, Department of
    - 5) Army Corps of Engineers
    - 6) Environmental Protection Agency
    - 7) Interior, Department of
    - 8) Bureau of Sport Fisheries and Wildlife
    - 9) Bureau of Outdoor Recreation
    - 10) Bureau of Land Management
    - 11) Bureau of Indian Affairs
    - 12) Bureau of Reclamation
    - 13) Labor, Department of
    - 14) Occupational Safety and Health Administration
    - 15) Transportation, Department of
    - 16) Coast Guard
    - 17) Federal Highway Administration
  - b. STATE AGENCIES:
    - 1) Agriculture, Department of
    - 2) Environmental quality, Department of
    - 3) Fish and Wildlife, Department of
    - 4) Forestry, Department of
    - 5) Geology and Mineral Industries, Department of
    - 6) Human Resources, Department of
    - 7) Land Conservation and Development Commission
    - 8) Soil and Water Conservation Commission
    - 9) State Engineer
    - 10) State Land Board
    - 11) Water Resources Board
  - c. LOCAL AGENCIES:
    - 1) City Council
    - 2) County Court
    - 3) County Commissioners, Board of
    - 4) Port Districts
    - 5) Metropolitan Service Districts



- 6) County Service Districts
- 7) Sanitary Districts
- 8) Water Districts
- 9) Fire Protection Districts

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

BLANK PAGE

**SECTION 00-7346  
PREVAILING WAGE RATES**

**PART 1 GENERAL**

**1.01 REQUIREMENTS:**

- A. The "Prevailing Wage Rates for Public Works Contracts in Oregon" dated July 5, 2023 including any issued corrections or amendments that follow are herein added to the Contract Documents by reference.
- B. BOLI Prevailing Wage Rate information is available upon request, or electronically at [www.oregon.gov/boli](http://www.oregon.gov/boli).
- C. Work under this Contract will be subject to the provisions of ORS 279C.800 to 279C.870, relating to BOLI Prevailing Wage Rates in effect at the time the project was advertised for bids.
- D. Provisions described in this Section or in Exhibit A of the Public Contracting Code Requirement for Public Improvements Contracts over \$50,000, located at the end of the Supplemental General Conditions, will apply regardless of the price of any individual Contract, so long as the combined price of all Contracts award on the project is \$50,000 or more.
- E. If total Contract amount does not exceed \$50,000, Contractor is not required to pay prevailing wage rates.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

BLANK PAGE

**SECTION 01-1000  
SUMMARY**

**PART 1 GENERAL**

**1.01 PROJECT**

- A. Project Name: Coquille Public Library Building - Renovation and Addition
- B. Owner's Name: City of Coquille.
- C. Architect's Name: HGE Architects, Inc.
- D. The Project consists of major renovations and additions to the former Banner Bank Building, to be converted to the new home of the Coquille Public Library Building.
  - 1. Work on this Project consists of the remodel of an existing former bank building into the Coquille Public Library. The existing building area of 8,560 sf is scheduled for renovation and minor alternations. An elevator and stair building addition is also part of the work, approximately 292 sf, for a total project area of 8,852 sf. Interior work includes demolition, vault door removal, partitions, restroom replacement, casework, doors, acoustical ceilings, flooring, elevator, fire supression sprinkler system, plumbing, replacement HVAC, and replacement electrical systems.

**1.02 CONTRACT DESCRIPTION**

- A. Contract Type: A single prime contract based on a Stipulated Price. Refer to General Conditions of the Contract for Construction.

**1.03 WORK BY OWNER.**

- A. Owner will, and with their own forces, dismantle, remove and deliver from the existing Public Library location to the project site, all existing library collections bookshelves as designated for reinstalled/relocated in the Project. Refer to Floor Plan for designated book stack and ranges. Bookshelves are designated as OFCI as indicated below.
- B. Items noted NIC (Not in Contract) will be supplied and installed by Owner after Substantial Completion. Some items include:
  - 1. Bookshelves, shelving, not designated as OFCI.
  - 2. Movable cabinets.
  - 3. Furnishings.
  - 4. Small equipment.
  - 5. Phone system.
  - 6. Security book scanner system/ walkthru pedestrals. Electrical rough-in by Contractor as noted in Drawings.
  - 7. Staff Lockers.
  - 8. Reader Board.

**1.04 OWNER FURNISHED CONTRACTOR INSTALLED ITEMS (OFCI):**

- A. Relocated bookshelving as noted in Drawings.
- B. Toilet Accessories as scheduled and noted.

- C. Paint. Owner will furnish all paint and paint primer. All other materials and preparation materials to be furnished by Contractor.
- D. Rough Carpentry - sawn lumber and structural plywood sheathing. Contractor provide bill of materials to Owner for the Owner's procurement.

**1.05 OWNER OCCUPANCY**

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

**1.06 CONTRACTOR USE OF SITE AND PREMISES**

- A. Construction Operations: Limited to areas noted on Drawings.
- B. Arrange use of site and premises to allow:
  - 1. Work by Others.
  - 2. Work by Owner.
- C. 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.
- D. Time Restrictions:
  - 1. Limit conduct of especially noisy exterior work to the hours of 7:00 a.m. - 5:00 p.m.
- E. Utility Outages and Shutdown:
  - 1. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
  - 2. Prevent accidental disruption of utility services to other facilities.

**1.07 WORK SEQUENCE**

- A. Coordinate construction schedule and operations with Owner.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01-2300  
ALTERNATES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Description of Alternates.

**1.02 ACCEPTANCE OF ALTERNATES**

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.

**1.03 SCHEDULE OF ALTERNATES**

- A. Alternate No. 1 - Window replacement:
1. Base Bid Item: No Work.
  2. Alternate Item: Remove existing north facing casement windows, enlarge window openings, strengthen openings with steel channel reinforcing, replace windows with insulated storefront windows. Refer to Drawings and Specifications.
- B. Alternate No. 2 - Casework:
1. Base Bid Item: Casework at detailed and specified for Circulation Desk and north wall of Staff Break only. MEP rough-in and blocking only for all other casework.
  2. Alternate Item: Provide all casework as indicated in the Drawings and Specifications.
- C. Alternate No. 3 - Flag pole:
1. Base Bid Item: No Work.
  2. Alternate Item: Furnish and install Flag Pole with integral lighting. Refer to Drawings and Specifications.
- D. Alternate No. 4 - Rolling Counter Door:
1. Base Bid Item: No Work.
  2. Alternate Item: Provide rolling counter door and all related hardware and track for complete system. Refer to Drawings and Specifications.
- E. Alternate No. 5 - Teen Room Window Replacement:
1. Base Bid Item: Window patch back only, to remove wall infill and replace with storefront window system. Refer to Drawings.
  2. Alternate Item: Replace entire window opening, remove all existing and replace with storefront window system. Refer to Drawings and Specifications.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

BLANK PAGE



**SECTION 01-3000  
ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

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

**1.03 REFERENCE STANDARDS**

- A. AIA G716 - Request for Information 2004.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PRECONSTRUCTION MEETING**

- A. Architect will schedule a meeting after Notice of Award.
- B. Attendance Required:
  - 1. Owner.
  - 2. Architect.
  - 3. General Contractor, contractor's superintendent(s) and major subcontractors.
- C. Agenda:
  - 1. Distribution of Contract Documents.
  - 2. Designation of personnel representing the parties to Contract, Owner, Contractor, and Architect.
  - 3. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.

4. Scheduling. Contractor to present and review schedule.
  5. Submittals. Contractor shall present and review submittal log and schedule.
- D. Record minutes and distribute copies within three days after meeting to participants, with emailed electronic 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 two-week intervals.
- B. Architect will 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 three days after meeting to participants, with emailed electronic 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 defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. Submit updated schedule at each construction progress meeting.

### **3.04 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 Contract Documents.
  2. A resolution to an issue which has arisen due to field conditions and affects design intent.

- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
  - 1. Prepare a separate RFI for each specific item.
    - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
    - b. Do not forward requests which solely require internal coordination between subcontractors.
  - 2. Prepare in a format and with content acceptable to Owner.
    - a. Use AIA G716 - Request for Information, or similar.
  - 3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
  - 1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
  - 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
    - a. Approval of submittals (use procedures specified elsewhere in this section).
    - b. Approval of substitutions (see Section - 01-6000 - Product Requirements)
    - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
    - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
  - 3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
  - 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
  - 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
  - 2. Owner's, Architect's, and Contractor's names.
  - 3. Discrete and consecutive RFI number, and descriptive subject/title.
  - 4. Issue date, and requested reply date.
  - 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
  - 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
  - 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.

- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
  - 1. Indicate current status of every RFI. Update log promptly and on a regular basis.
  - 2. Note dates of when each request is made, and when a response is received.
  - 3. Highlight items requiring priority or expedited response.
  - 4. Highlight items for which a timely response has not been received to date.
  - 5. Identify and include improper or frivolous RFIs.

### **3.05 SUBMITTAL SCHEDULE**

- A. Submit to Architect for review a schedule for submittals in tabular format.
  - 1. Submit at the same time as the preliminary schedule.
  - 2. Coordinate with Contractor's construction schedule and schedule of values.
  - 3. Format schedule to allow tracking of status of submittals throughout duration of construction.
  - 4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
  - 5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.

### **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.
  - 1. Excessively large submittals shall be separated into reasonable file size and clearly marked/named.
- B. Documents for Project Closeout: Make 2 reproductions of submittal originally reviewed (**three (3) total** project closeout documents).
- C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
  - 1. After review, produce duplicates.
  - 2. Retained samples will not be returned to Contractor unless specifically so stated.

### 3.09 SUBMITTAL PROCEDURES

- A. General Requirements:
  - 1. Use a separate transmittal for each item.
  - 2. 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.
  - 3. Schedule submittals to expedite the Project, and coordinate submission of related items.
    - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
    - b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
    - c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 days.
- B. Product Data Procedures:
  - 1. Submit only information required by individual specification sections.
  - 2. Collect required information into a single submittal.
  - 3. Submit concurrently with related shop drawing submittal.
  - 4. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
  - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
  - 2. Do not reproduce Contract Documents to create shop drawings.
  - 3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Samples Procedures:
  - 1. Transmit related items together as single package.
  - 2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
- E. Shop Drawing Procedures:
  - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
  - 2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.
- F. Transmit each submittal with a copy of approved submittal form.
- G. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

- H. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- I. 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.
- J. Schedule submittals to expedite the Project, and coordinate submission of related items.
- K. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
- L. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- M. Provide space for Contractor and Architect review stamps.
- N. When revised for resubmission, identify all changes made since previous submission.
- O. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- P. Submittals not requested will not be recognized or processed.

### **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.
- D. Architect's and consultants' actions on items submitted for review:
  - 1. Authorizing purchasing, fabrication, delivery, and installation:
    - a. "Approved", or language with same legal meaning.
    - b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
      - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
    - c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
  - 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.
- E. Architect's and consultants' actions on items submitted for information:
  - 1. Items for which no action was taken:
    - a. "Received" - to notify the Contractor that the submittal has been received for record only.
  - 2. Items for which action was taken:
    - a. "Reviewed" - no further action is required from Contractor.

**END OF SECTION**

BLANK PAGE



**SECTION 01-4000  
QUALITY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. References and standards.
- B. Quality assurance.
- C. Control of installation.
- D. Testing and inspection agencies and services.
- E. Contractor's construction-related professional design services.
- F. Control of installation.
- G. Mock-ups.
- H. Defect Assessment.

**1.02 REFERENCE STANDARDS**

- A. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing 2014a.

**1.03 CONTRACTOR'S CONSTRUCTION-RELATED PROFESSIONAL DESIGN SERVICES**

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Provide such engineering design services as may be necessary to plan and safely conduct certain construction operations, pertaining to, but not limited to the following:
  - 1. Temporary sheeting, shoring, or supports.
  - 2. Temporary scaffolding.
  - 3. Temporary bracing.
  - 4. Temporary stairs or steps required for construction access only.

**1.04 TESTING AND INSPECTION AGENCIES AND SERVICES**

- A. Owner will employ and pay for services of an independent testing agency to perform other 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 MOCK-UPS**

- A. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Architect will use accepted mock-ups as a comparison standard for the remaining Work.
- D. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

### **3.03 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. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
  - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
  - 3. Provide incidental labor and facilities:
    - a. To provide access to Work to be tested/inspected.
    - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
    - c. To facilitate tests/inspections.
    - d. To provide storage and curing of test samples.
  - 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
  - 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
  - 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- 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.

**3.04 DEFECT ASSESSMENT**

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

**END OF SECTION**

BLANK PAGE

**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. Waste removal facilities and services.

**1.02 TEMPORARY UTILITIES**

- A. Owner will provide the following:
  - 1. Water supply, consisting of connection point for Contractor.
- B. Provide and pay for all electrical power, lighting, heating and cooling, and ventilation required for construction purposes.
- C. Use trigger-operated nozzles for water hoses, to avoid waste of water.

**1.03 TELECOMMUNICATIONS SERVICES**

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
  - 1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.
  - 2. Internet Connections: Minimum of one; DSL modem or faster.

**1.04 TEMPORARY SANITARY FACILITIES**

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.

**1.05 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, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

**1.06 FENCING**

- A. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

**1.07 SECURITY**

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft. Maintain fencing to prohibit students from entering site from main high school campus area.

**1.08 WASTE REMOVAL**

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

**1.09 FIELD OFFICES**

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.
- C. Locate offices a minimum distance of 30 feet from existing and new structures.

**1.10 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS**

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.

**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. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations.
- E. Maintenance materials, including extra materials, spare parts, tools, and software.

**1.02 RELATED REQUIREMENTS**

- A. Document 00-2113 - Instructions to Bidders: Product options and substitution procedures prior to bid date.
- B. Section 01-4000 - Quality Requirements: Product quality monitoring.

**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.
- D. Procedure:
  - 1. Electronic submittals only, PDF format.
  - 2. Excessively large submittals shall be separated into reasonable file size and clearly marked/named.
  - 3. Identify submittals with specifications section name and number.

**PART 2 PRODUCTS**

**2.01 NEW PRODUCTS**

- A. Provide new products unless specifically required or permitted by the Contract Documents.

**2.02 PRODUCT OPTIONS**

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

## **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. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- B. 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.

### **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. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- 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. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- 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.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

**END OF SECTION**

BLANK PAGE

**SECTION 01-7000  
EXECUTION AND CLOSEOUT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Examination, preparation, and general installation procedures.
- B. Surveying for laying out the work.
- C. Cleaning and protection.
- D. Starting of systems and equipment.
- E. Demonstration and instruction of Owner personnel.
- F. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- G. 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.
- C. Section 01-4000 - Quality Requirements: Testing and inspection procedures.
- D. Section 01-5000 - Temporary Facilities and Controls: Temporary interior partitions.
- E. Section 01-7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.
- F. Section 01-7900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections

**1.03 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.

**1.04 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,

#### **1.05 PROJECT CONDITIONS**

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- D. 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. Minimize amount of bare soil exposed at one time.
  - 2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
  - 3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
  - 4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- E. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
- F. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

#### **1.06 COORDINATION**

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.

- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

## **PART 2 PRODUCTS**

## **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 LAYING OUT THE WORK**

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Contractor shall locate and protect survey control and reference points.
- D. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- E. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- F. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- G. Utilize recognized engineering survey practices.
- H. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.
- I. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
  - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
  - 2. Grid or axis for structures.

- 3. Building foundation, column locations, ground floor elevations.
- J. Periodically verify layouts by same means.
- K. Maintain a complete and accurate log of control and survey work as it progresses.

### **3.03 GENERAL INSTALLATION REQUIREMENTS**

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

### **3.04 CUTTING AND PATCHING**

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
  - 1. Complete the work.
  - 2. Fit products together to integrate with other work.
  - 3. Provide openings for penetration of mechanical, electrical, and other services.
  - 4. Match work that has been cut to adjacent work.
  - 5. Repair areas adjacent to cuts to required condition.
  - 6. Repair new work damaged by subsequent work.
  - 7. Remove samples of installed work for testing when requested.
  - 8. Remove and replace defective and non-complying work.
- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing.
- D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- F. Restore work with new products in accordance with requirements of Contract Documents.
- G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. 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.

### **3.05 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.

### **3.06 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. 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.
- G. Prohibit traffic from landscaped areas.
- H. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

### **3.07 SYSTEM STARTUP**

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

### **3.08 DEMONSTRATION AND INSTRUCTION**

- A. See Section 01-7900 - Demonstration and Training.

### **3.09 ADJUSTING**

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

### **3.10 FINAL CLEANING**

- A. Use cleaning materials that are nonhazardous.
- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- E. Clean filters of operating equipment.
- F. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
- G. Clean site; sweep paved areas, rake clean landscaped surfaces.
- H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

### **3.11 CLOSEOUT PROCEDURES**

- A. Make submittals that are required by governing or other authorities.
- B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- E. 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.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.



- H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

**3.12 MAINTENANCE**

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

**END OF SECTION**

BLANK PAGE

**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.
- D. Evidence of Payments and Release of Liens.

**1.02 RELATED REQUIREMENTS**

- A. Section 00-7200 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 01-3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. Section 01-7000 - Execution and Closeout Requirements: Contract closeout procedures.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. Individual Product Sections: Warranties required for specific products or Work.

**1.03 SUBMITTALS**

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
  - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
  - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
  - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
  - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
  - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
  - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
  - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

## **PART 2 PRODUCTS - NOT USED**

## **PART 3 EXECUTION**

### **3.01 PROJECT RECORD DOCUMENTS**

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
  - 1. Drawings.
  - 2. Specifications.
  - 3. Addenda.
  - 4. Change Orders and other modifications to the Contract.
- 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. Changes made by Addenda and modifications.
- F. Record Drawings: Legibly mark each item to record actual construction including:
  - 1. Field changes of dimension and detail.
  - 2. Details not on original Contract drawings.
  - 3. Contractor to submit clean set of Drawings, transferring all changes that occurred during construction from the working job set of Drawings to a clean set of Drawings. Submit to Architect for review and approval.

### **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.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

### **3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS**

- A. For Each Item of Equipment and Each System:
  1. Description of unit or system, and component parts.
  2. Identify function, normal operating characteristics, and limiting conditions.
  3. Include performance curves, with engineering data and tests.
  4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.
- E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- G. Provide servicing and lubrication schedule, and list of lubricants required.
- H. Include manufacturer's printed operation and maintenance instructions.
- I. Include sequence of operation by controls manufacturer.
- J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- K. Additional Requirements: As specified in individual product specification sections.

### **3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS**

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- D. Prepare data in the form of an instructional manual.

- E. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- G. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- H. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- I. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- J. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- K. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- L. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

### **3.06 WARRANTIES AND BONDS**

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
  - 1. General Warranties:
    - a. Provide one-year warranty as described in the General Conditions, Article 3.5. Warranty period shall commence on the date of the fully executed Certificate of Substantial Completion.
    - b. Weather-tight warranty: The Contractor shall, and hereby does, warranty flashings, roofing, and all other work which is a component part of the roofing to be weather-tight under ordinary wear and usage for a period of two years from and after Substantial Completion of the building. This is an extension of the general one year warranty described above. Further, the Contractor shall warranty that it will make good without delay all defects of labor and materials without additional cost to the Owner.
  - 2. Additional Warranties: See individual technical specification sections for written warranties for specific projects of work.
  - 3. Warranty period shall begin upon Substantial Completion, or if a Certificate of Substantial Completion is not issued or if Work which is to be covered by warranty is not then complete, Warranty Period shall begin upon the date of Final Acceptance or on the date appearing on the final Certificate for Payment to the Contractor, whichever is earlier.
- 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.

### **3.07 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS**

- A. Submit with Final Application for Payment the following:
  - 1. Contractor's Affidavit of Payment of Debts and Claims: AIA G706.
  - 2. Contractor's Affidavit of Release of Liens: AIA G706A, with
    - a. Consent of Surety to Final Payment (AIA G707) with accompanying Power of Attorney.
    - b. Contractor's release or waivers of liens.
    - c. Separate releases or waivers of liens for subcontractors, suppliers, and others with lien rights against property of Owner.

**END OF SECTION**

BLANK PAGE



**SECTION 01-7900  
DEMONSTRATION AND TRAINING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Demonstration of products and systems to be commissioned and where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance is required for:
  - 1. All software-operated systems.
  - 2. HVAC systems and equipment.
  - 3. Plumbing equipment.
  - 4. Electrical systems and equipment.
  - 5. Conveying systems.

**1.02 RELATED REQUIREMENTS**

- A. Section 01-7800 - Closeout Submittals: Operation and maintenance manuals.
- B. Other Specification Sections: Additional requirements for demonstration and training.

**1.03 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
  - 1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Authority.

**1.04 QUALITY ASSURANCE**

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 DEMONSTRATION - GENERAL**

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstration may be combined with Owner personnel training if applicable.
- C. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
  - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.

**3.02 TRAINING - GENERAL**

- A. Conduct training on-site unless otherwise indicated.
- B. Do not start training until Functional Testing is complete, unless otherwise specified or approved by the Commissioning Authority.
- C. Provide training in minimum two hour segments.
- D. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- E. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
  - 1. The location of the O&M manuals and procedures for use and preservation; backup copies.
  - 2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
  - 3. Typical uses of the O&M manuals.
- F. Product- and System-Specific Training:
  - 1. Review the applicable O&M manuals.
  - 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
  - 3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
  - 4. Provide hands-on training on all operational modes possible and preventive maintenance.
  - 5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
  - 6. Discuss common troubleshooting problems and solutions.
  - 7. Discuss any peculiarities of equipment installation or operation.
  - 8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
  - 9. Review recommended tools and spare parts inventory suggestions of manufacturers.
  - 10. Review spare parts and tools required to be furnished by Contractor.
  - 11. Review spare parts suppliers and sources and procurement procedures.
- G. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

**END OF SECTION**

**SECTION 02-4100  
DEMOLITION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Selective demolition of building elements for alteration purposes.
- B. Modification 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.
- D. Section 31-2323 - Fill: Filling holes, pits, and excavations generated as a result of removal operations.

**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 SCOPE**

- A. See Drawings for scope of demolition work.
- B. All work related to asbestos abatement of the building shall be performed by others. Coordinate Work with Abatement Contractor.

**3.02 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. Use of explosives is not permitted.
  - 3. 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.

4. Provide, erect, and maintain temporary barriers and security devices.
  5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
  6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
  7. Do not close or obstruct roadways or sidewalks without permit.
  8. 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.
  9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. 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.
- D. 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.
- E. Noise Control: Maintain a reasonable degree of quiet throughout progress of the work so as not to disturb Owner's work in adjoining rooms. Machines and tools must operate below OSHA noise and fume standards.
- F. 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.
- G. Perform demolition in a manner that maximizes salvage and recycling of materials.
1. Dismantle existing construction and separate materials.
  2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

### **3.03 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. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. 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.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

- H. 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.

### **3.04 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 shown.
  - 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. Separate areas in which demolition is being conducted from other areas that will not be demolished.
  - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01-5000 in locations indicated on drawings.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
- D. 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.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, 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. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
  - 3. See Section 01-1000 for other limitations on outages and required notifications.
  - 4. Verify that abandoned services serve only abandoned facilities before removal.
  - 5. 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.
- F. 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.

### **3.05 DEBRIS AND WASTE REMOVAL**

- A. Owner desires that as much existing building materials be salvaged as possible. Owner will work with local salvage organizations to coordinate pick up.
- B. Remove debris, junk, and trash from site.
- C. Remove from site all materials not to be reused on site; do not burn or bury.
- D. Leave site in clean condition, ready for subsequent work.

- E. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION**

**SECTION 03-1000  
CONCRETE FORMING AND ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

**1.02 RELATED REQUIREMENTS**

- A. Section 03-2000 - Concrete Reinforcing.
- B. Section 03-3000 - Cast-in-Place Concrete.

**1.03 REFERENCE STANDARDS**

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials 2010.
- B. ACI 301 - Specifications for Structural Concrete 2016.
- C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary 2014 (Errata 2018).
- D. ACI 347R - Guide to Formwork for Concrete 2014.
- E. PS 1 - Structural Plywood 2009.

**1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on void form materials and installation requirements.

**PART 2 PRODUCTS**

**2.01 FORMWORK - GENERAL**

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
- B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.
- C. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.
- D. Comply with relevant portions of ACI 347R, ACI 301, and ACI 318.

## **2.02 WOOD FORM MATERIALS**

- A. Softwood Plywood: PS 1, C Grade, Group 2.

## **2.03 FORMWORK ACCESSORIES**

- A. Form Ties: Removable type, stainless steel metal, fixed length, cone type, with waterproofing washer, free of defects that could leave holes larger than 1 inch in concrete surface.
- B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
- C. Filler Strips for Chamfered Corners: Rigid plastic type; 1/2 by 1/2 inch size; maximum possible lengths.
- D. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05-5000.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

### **3.02 ERECTION - FORMWORK**

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.

### **3.03 APPLICATION - FORM RELEASE AGENT**

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

### **3.04 INSERTS, EMBEDDED PARTS, AND OPENINGS**

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

### **3.05 FORMWORK TOLERANCES**



- A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.

**3.06 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01-4000 - Quality Requirements.
- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

**3.07 FORM REMOVAL**

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

**END OF SECTION**

BLANK PAGE

**SECTION 03-2000  
CONCRETE REINFORCING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

**1.02 RELATED REQUIREMENTS**

- A. Section 03-3000 - Cast-in-Place Concrete.
- B. Testing Agency Requirements.

**1.03 REFERENCE STANDARDS**

- A. ACI 301 - Specifications for Structural Concrete 2016.
- B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary 2014 (Errata 2018).
- C. ACI SP-66 - ACI Detailing Manual 2004.
- D. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.
- E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2018.
- F. CRSI (DA4) - Manual of Standard Practice 2009.

**1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
- C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

**1.05 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301.

**PART 2 PRODUCTS**

**2.01 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).

1. Deformed billet-steel bars.
  2. Unfinished.
- B. Reinforcement Accessories:
1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.
  2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

## **2.02 FABRICATION**

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
- B. Welding of reinforcement is not permitted.
- C. Locate reinforcing splices not indicated on drawings at point of minimum stress.

## **PART 3 EXECUTION**

### **3.01 PLACEMENT**

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.
- D. Maintain concrete cover around reinforcing as follows:
  1. Supported Slabs and Joists: 3/4 inch, not exposed to ground or weather.
  2. Walls (exposed to weather or backfill): 2 inch.
  3. Footings and Concrete Formed Against Earth: 3 inch.
  4. Slabs on Fill: 3 inch.
- E. Comply with applicable code for concrete cover over reinforcement.

### **3.02 FIELD QUALITY CONTROL**

- A. An independent testing agency, as specified in Section 01 4000 - Quality Requirements, will inspect installed reinforcement for conformance to contract documents before concrete placement.

**END OF SECTION**

**SECTION 03-3000  
CAST-IN-PLACE CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Floors and slabs on grade.
- B. Concrete foundation walls.
- C. Miscellaneous concrete elements, including equipment pads, light pole bases, flagpole bases, and thrust blocks.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 4000 - Quality Requirements.
- B. Section 32 1313 - Concrete Paving: Sidewalks, curbs and gutters.
- C. Section 03-2000 - Concrete Reinforcing.

**1.03 REFERENCE STANDARDS**

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials 2010.
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete 1991 (Reapproved 2009).
- C. ACI 301 - Specifications for Structural Concrete 2016.
- D. ACI 302.1R - Guide for Concrete Floor and Slab Construction 2004 (Errata 2007).
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000.
- F. ACI 306R - Cold Weather Concreting 2010.
- G. ACI 318 - Building Code Requirements for Structural Concrete and Commentary 2014 (Errata 2018).
- H. ACI 347R - Guide to Formwork for Concrete 2014.
- I. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2012.
- J. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2013.
- K. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2015a.
- L. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2015.
- M. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens) 2013.
- N. ASTM C150/C150M - Standard Specification for Portland Cement 2015.

- O. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method 2014.
- P. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete 2010a.
- Q. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete 2013.
- R. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2015.
- S. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2014.
- T. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures 2014.
- U. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs 2011.

#### **1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
- C. Test Reports: Submit report for each test or series of tests specified.
- D. Sustainable Design Submittal: If any fly ash, ground granulated blast furnace slag, silica fume, rice hull ash, or other waste material is used in mix designs to replace Portland cement, submit the total volume of concrete cast in place, mix design(s) used showing the quantity of portland cement replaced, reports showing successful cylinder testing, and temperature on day of pour if cold weather mix is used.

#### **1.05 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 306R when concreting during cold weather.

### **PART 2 PRODUCTS**

#### **2.01 FORMWORK**

- A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.
- B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
  1. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface. Fill all voids after cones have been removed.

#### **2.02 REINFORCEMENT MATERIALS**

- A. Comply with requirements of Section 03-2000.

### **2.03 CONCRETE MATERIALS**

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
  - 1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
  - 1. Acquire aggregates for entire project from same source.
- C. Fly Ash: ASTM C618, Class C or F.
- D. Calcined Pozzolan: ASTM C618, Class N.
- E. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.
- F. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

### **2.04 ADMIXTURES**

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C260/C260M.

### **2.05 ACCESSORY MATERIALS**

- A. Underslab Vapor Retarder: Sheet material complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
  - 1. Installation: Comply with ASTM E1643.
  - 2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
  - 3. Manufacturers:
    - a. Stego Industries, LLC; Stego Wrap Vapor Barrier 15 Mil.:  
[www.stegoindustries.com/#sle](http://www.stegoindustries.com/#sle).
    - b. Substitutions: See Section 01-6000 - Product Requirements.
- B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
  - 1. Grout: Comply with ASTM C1107/C1107M.
  - 2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.
- C. Epoxy Adhesive: Moisture-insensitive, two-part, consisting of epoxy resin, non-metallic aggregate, and activator.
  - 1. Manufacturers:
    - a. Hilti RE-500 V3.
    - b. Simpson SET-XP.
    - c. Or equivalent.

### **2.06 CONCRETE MIX DESIGN**

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
  - 1. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.

- B. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- C. Normal Weight Concrete:
  - 1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 4,000 psi, unless drawings indicate otherwise. Concrete should be a minimum of a 6-sack mix.
  - 2. Fly Ash Content: Maximum 25 percent of cementitious materials by weight.
  - 3. Water-Cement Ratio: Maximum 40 percent by weight.
  - 4. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.
  - 5. Maximum Slump: 4 inches.
  - 6. Maximum Aggregate Size: 3/4 inch.

## **2.07 MIXING**

- A. Transit Mixers: Comply with ASTM C94/C94M.
- B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

### **3.02 PREPARATION**

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

### **3.03 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304R.
- B. Notify Architect and Owner's Independent Testing Agency not less than 24 hours prior to commencement of placement operations.
- C. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

### **3.04 FLOOR FLATNESS AND LEVELNESS TOLERANCES**

- A. Maximum Variation of Surface Flatness:
  - 1. Exposed Concrete Floors: 1/4 inch in 10 feet.
  - 2. Under Seamless Resilient Flooring: 1/4 inch in 10 feet.
  - 3. Under Carpeting: 1/4 inch in 10 feet.



- B. Correct the slab surface if tolerances are less than specified.
- C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

### **3.05 CONCRETE FINISHING**

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/8 inch or more in height. Provide finish as follows:
  - 1. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
  - 2. Fill form tie holes with non shrink grout for uniform appearance and texture prior to grout cleaned finish above.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
  - 1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
  - 2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
  - 3. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
- E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

### **3.06 CURING AND PROTECTION**

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

### **3.07 FIELD QUALITY CONTROL**

- A. An independent testing agency, as specified in Section 01 4000 - Quality Requirements, will inspect installed reinforcement for conformance to contract documents before concrete placement.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

### **3.08 DEFECTIVE CONCRETE**

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

**3.09 PROTECTION**

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

**END OF SECTION**

**SECTION 04-2000  
UNIT MASONRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Clay Facing Brick.
- B. Mortar and Grout.
- C. Reinforcement and Anchorage.
- D. Flashings.
- E. Lintels.
- F. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 07-1900 - Water Repellants.
- B. Section 07-9005 - Joint Sealers: Sealing control and expansion joints.

**1.03 REFERENCE STANDARDS**

- A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2016.
- B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications 2015b.
- C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- D. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile 2014.
- E. ASTM C91/C91M - Standard Specification for Masonry Cement 2012.
- F. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar 2011.
- G. ASTM C150/C150M - Standard Specification for Portland Cement 2015.
- H. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes 2006 (Reapproved 2011).
- I. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale) 2014.
- J. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2019.
- K. ASTM C404 - Standard Specification for Aggregates for Masonry Grout 2011.
- L. ASTM C476 - Standard Specification for Grout for Masonry 2010.

- M. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing 2005.
- N. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls; 2005.
- O. BIA Technical Notes No. 46 - Maintenance of Brick Masonry 2005.
- P. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2016.

#### **1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

#### **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 BRICK UNITS**

- A. Facing Brick: ASTM C216, Type FBX, Grade MW.
  - 1. Color and texture: Color and texture to match existing.
  - 2. Actual size: Econ Size: 3 D x 2-1/2 H x 11-1/2 inch W.. Norman size brick.
  - 3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect. Special shapes include:
    - a. Half brick.
    - b. Corner brick.
  - 4. Compressive strength: 2200 psi, measured in accordance with ASTM C67.

#### **2.02 MORTAR AND GROUT MATERIALS**

- A. Masonry Cement: ASTM C91, Type S.
  - 1. Colored Mortar: Premixed cement as required to match Architect's color sample.
  - 2. Manufacturers:
    - a. Quikrete.
    - b. Specmix.
    - c. Substitutions: See Section 01-6000 - Product Requirements.
- B. Portland Cement: ASTM C150, Type I; color as required to produce approved color sample.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Mortar Aggregate: ASTM C144.
- E. Grout Aggregate: ASTM C404.
- F. Water: Clean and potable.
- G. Moisture-Resistant Admixture: Water repellent compound designed to reduce capillarity.
- H. Integral Water Repellent Admixture for Mortar and Grout: Polymeric liquid admixture added to mortar and grout at the time of manufacture.
  - 1. Use only in combination with masonry units produced with integral water repellent admixture.

2. Use only water repellent admixture for mortar and grout from the same manufacturer as water repellent admixture in masonry units.
3. Meet or exceed performance specified for water repellent admixture used in masonry units.

### **2.03 REINFORCEMENT AND ANCHORAGE**

- A. Manufacturers of Joint Reinforcement and Anchors:
  1. Hohmann & Barnard, Inc; X-Seal Anchor: [www.h-b.com/#sle](http://www.h-b.com/#sle).
  2. Dur-O-Wal: [www.dur-o-wal.com](http://www.dur-o-wal.com).
  3. Substitutions: See Section 01-6000 - Product Requirements.
- B. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, stainless steel.
  1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
  2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
  3. Vertical adjustment: Not less than 3-1/2 inches.
  4. Seismic Feature: Provide lip, hook, or clip on end of wire ties to engage or enclose not less than one continuous horizontal joint reinforcement wire of 0.1483 inch diameter (9 gauge).
  5. Product: Hohmann & Barnard, Inc. Seismic Anchor & Tie. Adjustable Veneer Anchor w/ 2-Hook & Seismicclip Interlock System.
    - a. HB-213 (5 inch). Verify size.

### **2.04 FLASHINGS**

- A. Stainless Steel/Polymer Fabric Flashing: ASTM A240/A240M stainless steel sheet bonded with rubber-based adhesive to one sheet of polymer fabric, and manufacturer's standard, self adhering, stainless steel lap tape.
  1. Manufacturers:
    - a. Hohmann & Barnard, Inc; Mighty-Flash Stainless Flashing: [www.h-b.com/#sle](http://www.h-b.com/#sle).
    - b. Substitutions: See Section 01-6000 - Product Requirements.
- B. Stainless Steel Flashing: ASTM A666, Type 304, soft temper; 26 gage (0.45 mm) thick; finish 2B to 2D.
- C. Flashing Sealant/Adhesives: Type compatible with type of flashing used.

### **2.05 ACCESSORIES**

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
  1. Manufacturers:
    - a. Dur-O-Wal: [www.dur-o-wal.com](http://www.dur-o-wal.com).
    - b. Hohmann & Barnard, Inc: [www.h-b.com/#sle](http://www.h-b.com/#sle).
    - c. Substitutions: See Section 01-6000 - Product Requirements.
- B. 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: Semi-rigid mesh designed for installation at flashing locations.
    - a. Manufacturers:

- 1) Advanced Building Products Inc; Mortar Break DT:  
[www.advancedbuildingproducts.com/#sle](http://www.advancedbuildingproducts.com/#sle).
- 2) Mortar Net Solutions: [www.mortarnet.com/#sle](http://www.mortarnet.com/#sle).
- 3) Substitutions: See Section 01-6000 - Product Requirements.

- C. Weeps: Rolled high impact polystyrene sheets.
1. MTI Masonry Technology Incorporated, Brick Cavity Weep CV 5010. Discription: Rolled product of self-spaced weeps, 0.024 inch thick, formed with corrigations. Website: [MTIdry.com/cavity-weep](http://MTIdry.com/cavity-weep).
  2. Substitutions: See Section 01-6000 - Product Requirements.
- D. Cavity Vents: Polyester mesh.
- E. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

## **2.06 LINTELS**

- A. Hot dipped galvanized steel lintels. Refer to Structural Drawings and Architectural Details, Section 05-5000.

## **2.07 MORTAR AND GROUT MIXES**

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
1. Exterior, 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.

## **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.

### **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. Brick Units:
  1. Bond: 1/3 Running Bond. Match existing building coursing.
  2. 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.

### **3.06 WEEPS/CAVITY VENTS**

- A. Install rolled cavity weep in veneer and cavity walls continuous horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls. Rolled weep product provides weeps at 9.5 inches on-center.
  1. Place centered in cavity and legs extending out from face of wall about 1 to 1-1/2 inch.
  2. Place bed joint of mortar on Cavity Weep and lay masonry units.
  3. Tool joints, lightly score legs at face of wall, and crack off by pushing downward while mortar is still plastic.
  4. Finish tool joint and brush.
- B. Install cavity vents in veneer and cavity walls at 32 inches on center horizontally below shelf angles and lintels and near top of walls.

### **3.07 CAVITY MORTAR CONTROL**

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

### **3.08 REINFORCEMENT AND ANCHORAGE - GENERAL**

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center, and/or 2 sq. ft. maximum wall area support per anchor.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

### **3.09 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER**

- A. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- B. Seismic Reinforcement: Connect veneer anchors with continuous horizontal wire reinforcement before embedding anchors in mortar.

### **3.10 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 8 inches, 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. Extend metal flashings through exterior face of masonry and turn down to form drip. Install joint sealer below drip edge to prevent moisture migration under flashing.
- C. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

### **3.11 LINTELS**

- A. Install brick support system/lintel as detailed at locations indicated on drawings.

### **3.12 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, 1/2 inch wide and full depth of masonry.
- D. Form expansion joint as detailed on drawings.

### **3.13 BUILT-IN WORK**

- A. As work progresses, install built-in window frames and rain drain overflow nozzles 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.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.

### **3.14 TOLERANCES**

- A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.



- C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- E. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.

### **3.15 CUTTING AND FITTING**

- A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

### **3.16 CLEANING**

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.

### **3.17 PROTECTION**

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

**END OF SECTION**

BLANK PAGE

**SECTION 04-4200  
EXTERIOR STONE CLADDING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Cut marble veneer at exterior walls.
- B. Metal anchors and supports.
- C. Sealing exterior joints.

**1.02 REFERENCE STANDARDS**

- A. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications 2015b.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- C. ASTM C119 - Standard Terminology Relating to Dimension Stone 2020.
- D. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2019.
- E. ASTM C503/C503M - Standard Specification for Marble Dimension Stone 2015.
- F. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2014.
- G. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants 2018.
- H. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants 2018.
- I. ASTM C1528/C1528M - Standard Guide for Selection of Dimension Stone 2020.
- J. NSI (DSDM) - Dimensional Stone Design Manual, Version VIII 2016.

**1.03 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Samples: Submit two stone samples 12 by 12 inch in size, illustrating color range and texture, markings, surface finish.

**1.04 QUALITY ASSURANCE**

- A. Perform work in accordance with NSI (DSDM).

**1.05 FIELD CONDITIONS**

- A. During temporary storage on site, at the end of working day, and during rainy weather, cover stone work exposed to weather with non-staining waterproof coverings, securely anchored.

## **PART 2 PRODUCTS**

### **2.01 STONE**

- A. Stone, General: See recommendations in ASTM C1528/C1528M.
- B. Marble: \_\_\_\_\_ variety; complying with ASTM C503/C503M Classification I - Calcite.
  - 1. Grade: NSI Group A.
  - 2. Color: \_\_\_\_\_.
  - 3. Surface Finish: Polished; as described in ASTM C119 and ASTM C1528/C1528M.

### **2.02 MORTAR**

- A. Mortar: ASTM C270, Type N, Proportion specification, using Portland cement of gray color. Match existing.

### **2.03 ANCHORS AND ACCESSORIES**

- A. Anchors and Other Components in Contact with Stone: Stainless steel, ASTM A666 Type 304.
  - 1. Sizes and configurations: As required for vertical and horizontal support of stone and applicable loads.
  - 2. Wire ties are not permitted.
- B. Support Components not in Contact with Stone: Stainless steel, ASTM A240/A240M Type 304.
- C. Setting Buttons and Shims: Lead type.
- D. Joint Sealant: ASTM C920 silicone sealant with movement capability of at least plus/minus 25 percent and non-staining to stone when tested in accordance with ASTM C1248.
- E. Joint Backer Rod: ASTM C1330 open cell polyurethane of size 40 to 50 percent larger in diameter than joint width.

### **2.04 STONE FABRICATION**

- A. Thickness: 3/4 inch.
- B. Fabricate units for uniform coloration between adjacent units and over the full area of the installation.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that support work and site conditions are ready to receive work of this section.
- B. Verify that items built-in under other sections are properly located and sized.

### **3.02 PREPARATION**

- A. Clean stone prior to erection. Do not use wire brushes or implements that will mark or damage exposed surfaces.

### **3.03 INSTALLATION**

- A. Set stone with a consistent joint width of 3/8 inch.
- B. Install anchors and place setting buttons to support stone and to establish joint dimensions.
- C. Install weep/cavity vents in vertical stone joints at 36 inches on center horizontally, at bottom of walls; do not permit mortar accumulation in cavity space.
- D. Joints in Exterior Work: Seal joints with joint sealant over backer rod, following sealant manufacturer's instructions; tool sealant surface to concave profile.

### **3.04 CUTTING AND FITTING**

- A. Obtain approval prior to cutting or fitting any item not so indicated on drawings.
- B. Do not impair appearance or strength of stone work by cutting.

**END OF SECTION**

BLANK PAGE

**SECTION 05-5000  
METAL FABRICATIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Shop fabricated steel items.

**1.02 RELATED REQUIREMENTS**

- A. Section 04-2000 - Unit Masonry: Placement of metal fabrications in masonry.

**1.03 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2012.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2015.
- D. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2014.
- E. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions 2015a.
- F. AWS D1.1/D1.1M - Structural Welding Code - Steel 2015.

**1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

**PART 2 PRODUCTS**

**2.01 MATERIALS - STEEL**

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, hot-dip galvanized finish.
- E. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.

- F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

## **2.02 FABRICATION**

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

## **2.03 FABRICATED ITEMS**

- A. Bumper Posts, Handrails, Guard Rails, and Handrails: As detailed; prime paint finish.
  - 1. Handrail support brackets: Julius Blum & Co. Wall Bracket - Model 275 Stainless Steel.
- B. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; galvanized finish.
- C. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of joists; galvanized finish.
- D. Lintels: As detailed; galvanized finish.
- E. Downspouts: As detailed, galvanized finish.
- F. Elevator Hoistway Divider Beams: Beam sections; prime paint finish.

## **2.04 METAL STAIR RAIL SCREEN**

- A. McNichols or approved.
- B. See Drawings for sizes and details.

## **2.05 FINISHES - STEEL**

- A. Prepare surfaces to be primed in accordance with SSPC-SP2, interior items.
- B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- C. Prime Painting: One coat, interior items.
- D. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements.
- E. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A 123/A 123M requirements.



1. Location: All exterior fabricated steel items including handrails to be hot-dipped galvanized.

## **2.06 FABRICATION TOLERANCES**

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.

### **3.02 PREPARATION**

- A. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

### **3.03 INSTALLATION**

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Obtain approval prior to site cutting or making adjustments not scheduled.

### **3.04 TOLERANCES**

- A. Maximum Offset From True Alignment: 1/4 inch.
- B. Maximum Out-of-Position: 1/4 inch.

**END OF SECTION**

BLANK PAGE

**SECTION 05-5150  
LADDERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Aluminum access ladders.
- B. Safety pole.

**1.02 RELATED SECTIONS**

- A. Section 05-5000 – Metal Fabrications: Fasteners and installation requirements used to attach ladders to structure.

**1.03 REFERENCES**

- A. AA – Aluminum Association.
- B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- C. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- D. OSHA 1910.27 – Fixed Ladders.

**1.04 SUBMITTALS**

- A. Submit under provisions of Section 01-3000.
- B. Product Data: Manufacturer's data sheets on each product.
- C. Shop Drawings:
  - 1. Detail fabrication and erection of each ladder indicated. Include plans, elevations, sections, and details of metal fabrications and their connections.
  - 2. Provide templates for anchors and bolts specified for installation under other Sections.
  - 3. Provide reaction loads for each hanger and bracket.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A firm experienced in producing aluminum metal ladders similar to those indicated for this Project.
  - 1. Record of successful in-service performance.
  - 2. Sufficient production capacity to produce required units.
  - 3. Professional engineering competent in design and structural analysis to fabricate ladders in compliance with industry standards and local codes.
- B. Installer Qualifications: Competent and experienced firm capable of selecting fasteners and installing ladders to attain designed operational and structural performance.
- C. Product Qualification: Product design shall comply with OSHA 1910.27 minimum standards for ladders.

## **1.06 PROJECT CONDITIONS**

- A. Field Measurements: Verify dimensions by field measurement before fabrication.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, indicate established dimensions on shop drawing submittal and proceed with fabrication.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Acceptable Manufacturer: O’Keeffe’s, Inc.; 325 Newhall St. San Francisco, CA 94124. ASD. Toll Free Tel: (888) 653-3333. Tel: (415) 824-4900. Fax: (415) 824-5900. Email: info@okeeffes.com. Web: http://www.okeeffes.com.
- B. Substitutions: See Section 01-6000 - Product Requirements.

### **2.02 APPLICATIONS/SCOPE**

- A. Fixed Access Ladder:
  - 1. Standard Duty Channel Rail.
    - a. Model 500 as manufactured by O’Keeffe’s Inc.
    - b. Provide telescoping safety post.
    - c. Location: Replace existing wooden ladder.
    - d. Qt: one (1).

### **2.03 FINISHES**

- A. Mill finish. As extruded.

### **2.04 MATERIALS**

- A. Aluminum Sheet: Alloy 5005-H34 to comply with ASTM B209.
- B. Aluminum Extrusions: Alloy 6063-T6 to comply with ASTM B221.

### **2.05 FABRICATION**

- A. Rungs shall withstand a 500 pound load without deformation or failure.
- B. Channel Side Rails: Not less than 1/8 inch wall thickness by 3 inches wide.
- C. Ladder Safety Post: Retractable hand hold and tie off.
  - 1. Location: At standard fixed ladder only, to provide hand hold up thru roof hatch.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Coordinate anchorages. Furnish setting drawings, templates, and anchorage structural loads for fastener resistance.

- B. Do not begin installation until supporting structure is complete and ladder installation will not interfere with supporting structure work.
- C. If supporting structure is the responsibility of another installer, notify Architect of unsatisfactory supporting work before proceeding.

**3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction.

**3.03 PROTECTION**

- A. Protect installed products until completion of project.

**END OF SECTION**

BLANK PAGE

**SECTION 05-7311  
DECORATIVE METAL AND GLAZED METAL RAILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Railing and handrail assemblies.
- B. Metal railings.
- C. Structural glass railings.

**1.02 RELATED REQUIREMENTS**

- A. Section 08-8000 - Glazing. Glazed Metal Railings with 1/2 inch safety glazing specified this section.

**1.03 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials current edition.
- B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2012.
- C. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2014.
- E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric] 2013.
- F. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2012.
- G. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass 2014.
- H. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards 2014.
- I. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0 2016.

**1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's product data, including description of materials, components, and finishes.
- C. Shop Drawings: Indicate railing system elevations and sections, details of profile, dimensions, sizes, connection attachments, anchorage, size and type of fasteners, and accessories. Indicate anchor and joint locations, transitions, and terminations.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials in factory-provided protective coverings and packaging.
- B. Protect materials against damage during transit, delivery, storage, and installation at site.
- C. Inspect materials upon delivery for damage. Replace damaged items.
- D. Prior to installation, store materials and components under cover in a dry location.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURER**

- A. Viva Railings, LLC: 151 W. Vista Ridge Mall Drive, Lewisville, TX 75067. 972-353-8482. [www.vivarailings.com/#sle](http://www.vivarailings.com/#sle).
- B. AGS Stainless, Clearview Railing System.
  - 1. Clearview Railing System - Basis of Design.
- C. Substitutions: See Section 01-6000 - Product Requirements.

### **2.02 RAILING SYSTEMS, GENERAL**

- A. Factory- or shop-fabricate to suit project conditions, for proper connection to building structure, and in largest practical sizes for delivery to site.
- B. Handrails: Comply with applicable accessibility requirements of ADA Standards.
- C. Joints: Tightly fitted and secured, machined smooth with hairline seams.
- D. Field Connections: Provide sleeves, anchors, and other devices required for site assembly and installation.
- E. Welded Joints: Make visible joints butt tight, flush, and hairline; use methods that avoid discoloration and damage of finish; grind smooth, polish, and restore to required finish.

### **2.03 METAL RAILINGS**

- A. Metal Railing: Engineered, post-supported railing system with metal or glass infill.
  - 1. End and Intermediate Posts: Stainless steel; configuration shown on drawings.
    - a. Post size: 1-1/2 x 1-1/2 inch, typical.
  - 2. Top Rail and Grip Rail: Rectangular, hardwood, 2 x 4 nominal-inch.
  - 3. Handrail Brackets: Same metal as railing.
  - 4. Infill: Glass; as specified in this section.
- B. Metal Railing: Engineered, post-supported railing system with metal or glass infill.
  - 1. End and Intermediate Posts: Stainless steel; configuration shown on drawings.
  - 2. Grip Rail: Round, stainless steel, 1-1/2-inch diameter.
  - 3. Infill: Glass; as specified in this section.
- C. Wall-Mounted Handrail: Engineered, bracket-supported railing.
  - 1. Handrail: 1-1/2-inch diameter stainless steel; No.4 bright finish.
  - 2. Handrail Brackets: Manufacturer's standard stainless steel brackets.
    - a. Mounting: Wall.
    - b. Finish: No.4 bright finish.



## **2.04 STRUCTURAL GLASS RAILINGS**

- A. Structural Glass Railing System, Clamp-Mounted: Engineered, point-supported railing system with structural glass.
  - 1. Clamps: Stainless steel pressure clamps; no holes drilled in glass.
  - 2. Glass: As specified in this section.

## **2.05 MATERIALS AND FINISHES**

- A. Glass:
  - 1. Laminated Safety Glass: ASTM C1172, unless otherwise indicated.
    - a. Plastic Interlayer: PVB, 0.035 inch thick.
    - b. Impact Strength: Category II, tested in accordance with 16 CFR 1201.
    - c. Thickness: 1/2 inch.
    - d. Configuration: As indicated on drawings.
    - e. Edges: Ground smooth and polished.
    - f. Finish: Plain, no finish.
    - g. Color: Clear, no tint.
- B. Wood for Railings: Comply with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 7 - Stairwork & Rails; manufacturer's standard grade.
  - 1. Species: Maple.

## **2.06 ACCESSORIES**

- A. Anchors and Fasteners: Provide anchors and other materials as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable, provide flush countersunk fasteners.
  - 1. For anchorage to concrete, provide inserts to cast into concrete for bolt anchors.
  - 2. For anchorage to masonry, provide brackets to embed in masonry for bolt anchors.
  - 3. For anchorage to stud walls, provide backing plates for bolt anchors.
  - 4. Exposed Fasteners: No exposed bolts or screws.
- B. Carbon Steel Bolts and Nuts: ASTM A307.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate and site conditions are acceptable and ready to receive work.
- B. Verify field dimensions of locations and areas to receive work.
- C. Notify Architect immediately of conditions that would prevent satisfactory installation.
- D. Do not proceed with work until detrimental conditions have been corrected.
- E. Furnish components to be installed in other work to installer of that other work, including but not limited to blocking, sleeves, inserts, anchor bolts, embedded plates, and supports for attachment of anchors.

### **3.02 PREPARATION**

- A. Review installation drawings before beginning installation. Coordinate diagrams, templates, instructions, and directions for installation of anchorages and fasteners.
- B. Clean surfaces to receive units. Remove materials and substances detrimental to the installation.

### **3.03 INSTALLATION**

- A. Use manufacturer's approved installer.
- B. Comply with manufacturer's drawings and written instructions.
- C. Install components plumb and level, accurately fitted, free from distortion or defects, and with tight joints, except where necessary for expansion.
- D. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Anchor securely to structure.
- F. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- G. Isolate dissimilar materials with bituminous coating, bushings, grommets, or washers to prevent electrolytic corrosion.

### **3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch per floor level, noncumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

### **3.05 CLEANING**

- A. Metal: Clean exposed metal finishes with potable water and mild detergent, in accordance with manufacturer recommendations; do not use abrasive materials or chemicals, detergents, or other substances that may damage the material or finish.
- B. Glass and Glazing: Clean glazing surfaces; remove excess glazing sealant compounds, dirt, and other substances.

### **3.06 PROTECTION**

- A. Repair damage to exposed finishes to be indistinguishable from undamaged areas.
  - 1. If damage to finishes and components cannot be repaired to be indistinguishable from undamaged finishes and components, replace damaged items.

**END OF SECTION**

**SECTION 06-1000  
ROUGH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Structural dimension lumber framing.
- B. Non-structural dimension lumber framing.
- C. Rough opening framing for doors, windows, and roof openings.
- D. Sheathing.
- E. Subflooring.
- F. Preservative treated wood materials.
- G. Miscellaneous framing and sheathing.
- H. Communications and electrical room mounting boards.
- I. Concealed wood blocking, nailers, and supports.
- J. Miscellaneous wood nailers, furring, and grounds.

**1.02 RELATED REQUIREMENTS**

- A. Section 06-1800 - Glued-Laminated Construction.
- B. Section 07-2500 - Weather Barriers: Water-resistive barrier over sheathing.
- C. Section 07-6200 - Sheet Metal Flashing and Trim: Sill flashings.

**1.03 REFERENCE STANDARDS**

- A. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; American Forest and Paper Association; 2012.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2009.
- C. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing 2003 (Reapproved 2009).
- D. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing 2018a.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2015a.
- F. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings 2015.
- G. AWPA U1 - Use Category System: User Specification for Treated Wood 2012.

- H. PS 1 - Structural Plywood 2009.
- I. PS 2 - Performance Standard for Wood-Based Structural-Use Panels 2010.
- J. PS 20 - American Softwood Lumber Standard 2010.
- K. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17 2004, and supplements.

## **PART 2 PRODUCTS**

### **2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. Species: Douglas Fir-Larch, unless otherwise indicated.
  - 2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
  - 3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee ([www.alsc.org](http://www.alsc.org)) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

### **2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Grading Agency: West Coast Lumber Inspection Bureau; WCLIB (GR).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Stud Framing (2 by 2 through 2 by 6 ):
  - 1. Species: Douglas Fir-Larch.
  - 2. Grade: No. 2.
- E. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16 ):
  - 1. Species: Douglas Fir-Larch.
  - 2. Grade: No. 2 & Btr.
- F. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
  - 1. Lumber: S4S, No. 2 or Standard Grade.
  - 2. Boards: Standard or No. 3.

### **2.03 EXPOSED DIMENSION LUMBER**

- A. Sizes: Nominal sizes as indicated on drawings.
- B. Surfacing: S4S.
- C. Sizes: Nominal sizes as indicated on drawings, Rough (unsurfaced).
- D. Moisture Content: Kiln-dry or MC15.

### **2.04 TIMBERS**

- A. Sizes: Nominal sizes as indicated on drawings, S4S.

- B. Moisture Content: S-dry (23 percent maximum).
- C. Beams and Posts 5 inches and over in thickness:
  - 1. Grade: No. 2.

## **2.05 CONSTRUCTION PANELS**

- A. Subflooring: PS 2 type, rated Sheathing.
  - 1. Bond Classification: Exterior.
  - 2. Edges: Tongue and groove.
  - 3. Span Rating: 48.
  - 4. Performance Category: 3/4 PERF CAT.
  - 5. Thickness: 3/4 inch.
- B. Roof Sheathing : APA PRP-108/APA PRPR-108, Form B455, Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
  - 1. Span Rating: 24/16.
  - 2. Thickness: 5/8 inch, nominal, 19/32 inch actual.
  - 3. Edges: square.
- C. Wall Sheathing: APA PRP-108/APA PRP-108, Form B455 Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
  - 1. Span Rating: 24/16.
  - 2. Thickness: 5/8 inch, nominal, 19/32 inch actual.
  - 3. Wall Sheathing: Plywood, PS 1, Grade C-D, Exposure I.
- D. Communications and Electrical Room Mounting Boards: PS 1 A-C plywood; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
  - 1. Refer to Finish Carpentry regarding plywood wainscote.

## **2.06 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. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.
- C. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, closed cell plastic foam from continuous rolls.
- D. Subfloor Adhesives: Waterproof, air cure type, cartridge dispensed; adhesives designed for subfloor applications and complying with either ASTM C557 or ASTM D3498.
- E. Water-Resistive Barrier: As specified in Section 07-2500.

## **2.07 FACTORY WOOD TREATMENT**

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
  - 1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

- B. Preservative Treatment:
  - 1. Manufacturers:
    - a. Lonza Group: [www.wolmanizedwood.com/#sle](http://www.wolmanizedwood.com/#sle).
    - b. Viance, LLC: [www.treatedwood.com](http://www.treatedwood.com).
    - c. Osmose, Inc: [www.osmose.com](http://www.osmose.com).
    - d. Substitutions: See Section 01-6000 - Product Requirements.
  - 2. Preservative Pressure Treatment of Lumber Above Grade: AWP A U1, Use Category UC4A, Commodity Specification A using waterborne preservative to 0.40 lb/cu ft retention.
    - a. Treat lumber exposed to weather.
    - b. Treat lumber in contact with roofing, flashing, or waterproofing.
    - c. Treat lumber in contact with masonry or concrete.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.
- B. Coordinate installation of rough carpentry members specified in other sections.

### **3.02 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

### **3.03 FRAMING INSTALLATION**

- A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
- 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 and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
- F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

### **3.04 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
- C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- F. Provide the following specific non-structural framing and blocking:
  - 1. Cabinets and shelf supports.
  - 2. Wall brackets.
  - 3. Toilet Partitions.
  - 4. Handrails.
  - 5. Grab bars.
  - 6. Towel and bath accessories.
  - 7. Wall-mounted door stops.
  - 8. Chalkboards and marker boards.

### **3.05 INSTALLATION OF CONSTRUCTION PANELS**

- A. Subflooring: Glue and nail to framing; staples are not permitted.
- B. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
  - 1. At long edges provide solid edge blocking where joints occur between roof framing members, as indicated on Roof Framing Plan
  - 2. Nail panels to framing; staples are not permitted.
- C. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
  - 1. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges and ends.
- D. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
  - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
  - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
  - 3. Install adjacent boards without gaps.

### **3.06 SITE APPLIED WOOD TREATMENT**

- A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.

- B. Allow preservative to dry prior to erecting members.

**3.07 TOLERANCES**

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

**3.08 CLEANING**

- A. Waste Disposal:
  - 1. Comply with applicable regulations.
  - 2. Do not burn scrap on project site.
  - 3. Do not burn scraps that have been pressure treated.
  - 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION**



**SECTION 06-1800  
GLUED-LAMINATED CONSTRUCTION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Glue laminated wood beams and purlins.
- B. Steel hardware and attachment brackets.

**1.02 REFERENCE STANDARDS**

- A. AITC A190.1 - American National Standard for Wood Products - Structural Glued Laminated Timber 2007.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2015.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2009.
- E. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength 2014.
- F. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric) 2014.
- G. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts 2007a (Reapproved 2014).
- H. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts [Metric] 2007.

**1.03 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. See Section 01-3000 - Shop Drawings, Product Data, Samples for submittal procedures.
- C. Product Data: Provide technical data on wood preservative materials, application technique and resultant performance information.
- D. Shop Drawings: Indicate framing system, sizes and spacing of members, loads and cambers, bearing and anchor details, bridging and bracing, framed openings .
  - 1. Submit design calculations signed and sealed by design engineer.
- E. Designer's Qualification Statement.
- F. Manufacturer's Qualification Statement.
- G. Samples: Submit 2 samples of CLT panels; approximately 12 by 12 by 3-ply for field applied coatings by others.

#### **1.04 QUALITY ASSURANCE**

- A. Designer Qualifications: Design structural members under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Oregon.
- B. Manufacturer/Fabricator Qualifications: Company specializing in manufacture of glue laminated structural units with three years of documented experience, and certified by AITC in accordance with AITC A190.1.

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Protect members to AITC requirements for individually wrapped.
- B. Leave individual wrapping in place until finishing occurs.
- C. Support units during shipment on non-staining material in same position as during storage.
- D. Store units with adequate bracing and protect units to prevent contact with soil and separated with striping (so air may circulate around all faces of members), to prevent staining, and to prevent cracking, distortion, warping or other physical damage.
  - 1. Place stored units so identification marks are clearly visible.
  - 2. Handle and transport units in a position consistent with their shape and design in order to avoid excessive stresses that would cause cracking or damage. Protect corners with wood blocking.
  - 3. Lift and support units only at designated points shown on Shop Drawings.
  - 4. Slit underside of membrane covering during storage at Site. Do not deface members.
  - 5. Cover top with opaque moisture resistant membrane.
  - 6. Maintain protection of CLT panel at all times during construction.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Glued-Laminated Structural Units:
  - 1. Western Wood Structures, Inc: [www.westernwoodstructures.com/#sle](http://www.westernwoodstructures.com/#sle).
  - 2. Structurlam.
  - 3. Substitutions: See Section 01-6000 - Product Requirements.

#### **2.02 GLUED-LAMINATED UNITS**

- A. Glued-Laminated Units: Fabricate in accordance with AITC 117 Industrial grade.
  - 1. Verify dimensions and site conditions prior to fabrication.
  - 2. Cut and fit members accurately to length to achieve tight joint fit.
  - 3. Fabricate member with camber built in.
  - 4. Do not splice or join members in locations other than those indicated without permission.
  - 5. After end trimming, seal with penetrating sealer in accordance with AITC requirements.
- B. Performance Criteria:
  - 1. Comply with applicable code for loads, seismic zoning, and other load criteria.
  - 2. Refer to Structural Drawing for additional requirements. The most stringent design/performance requirements apply in all situations.

#### **2.03 MATERIALS**

- A. Lumber: Softwood lumber conforming to RIS grading rules with 12 percent maximum moisture content before fabrication. Design for the following values, unless indicated otherwise in Drawings:
  - 1. Bending (Fb): 2400 psi.
  - 2. Tension Parallel to Grain (Ft): 1500 psi.
  - 3. Compression Parallel to Grain (Fc): 1650 psi.
  - 4. Compression Perpendicular to Grain Bottom (Fc1): 650 psi.
  - 5. Compression Perpendicular to Grain Top (Fc1): 650 psi.
  - 6. Horizontal Shear (Fv): 165 psi.
  - 7. Modulus of Elasticity (E): 1,600,000 psi.
- B. Steel Connections and Brackets: ASTM A36/A36M weldable quality, galvanize per ASTM A123/A123M.
- C. Hardware: Type 1 high strength heavy hex bolts and nuts, hot-dip galvanized to meet requirements of ASTM A153/A153M, matching washers.

## **2.04 FABRICATION**

- A. Fabricate glue laminated structural members in accordance with AITC Industrial grade.
- B. Verify dimensions and site conditions prior to fabrication.
- C. Cut and fit members accurately to length to achieve tight joint fit.
- D. Fabricate member with camber built in.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that supports are ready to receive units.
- B. Verify sufficient end bearing area.

### **3.02 ERECTION**

- A. Lift members using protective straps to prevent visible damage.
- B. Set structural members level and plumb, in correct positions or sloped where indicated.

### **3.03 TOLERANCES**

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

### **3.04 CLEANING**

- A. Clean exposed surfaces of Glu Laminated Timber and CLT panels after erection and completion of field touch up.
- B. Perform cleaning procedures, if necessary, according to CLT manufacturer's written recommendations, Protect other work from staining or damage due to cleaning operations.
- C. Do not use cleaning materials or processes that could change the appearance of exposed CLT panels or damage adjacent materials.

**END OF SECTION**

**SECTION 06-2000  
FINISH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Finish carpentry items.
- B. Wood casings and moldings.

**1.02 RELATED REQUIREMENTS**

- A. Section 06-1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 06-4100 - Architectural Wood Casework: Shop fabricated custom cabinet work.
- C. Section 09-9000 - Paints and Coatings: Painting of finish carpentry items.

**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. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.
- D. NHLA G-101 - Rules for the Measurement & Inspection of Hardwood & Cypress 2011.
- E. PS 1 - Structural Plywood 2009.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

**1.05 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements for submittal procedures.
- B. Samples: Submit two samples of finish plywood, 12 by 12 inch in size illustrating wood grain and specified finish.
- C. Samples: Submit two samples of wood trim 12 inch long.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Protect work from moisture damage.

**PART 2 PRODUCTS**

## **2.01 FINISH CARPENTRY ITEMS**

- A. Unless otherwise indicated provide products of quality specified by AWI Architectural Woodwork Quality Standards Illustrated for Premium grade.
- B. Unless otherwise indicated provide products of quality specified by Woodwork Institute Manual of Millwork for Premium grade.
- C. Exterior Woodwork Items:
  - 1. Window Casings and Moldings: Softwood; prepare for paint finish.
  - 2. Soffits and Fascias: Prepare for paint finish.
- D. Interior Woodwork Items:
  - 1. See Drawings, Details for locations.
  - 2. Handrails: Maple; prepare for stained finish.

## **2.02 WOOD-BASED COMPONENTS**

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

## **2.03 LUMBER MATERIALS**

- A. Softwood Lumber: Doug-Fir KD S4s, clear vertical grain species, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.
  - 1. Grading: In accordance with rules certified by ALSC; [www.alsc.org](http://www.alsc.org).
  - 2. Location: Interior.
- B. Softwood Lumber: Resawn texture cedar, K.D., grade C and better species, maximum moisture content of 6 percent; , primed, fingerjointed, 20 foot lengths.
  - 1. Location: Exterior.
- C. Hardwood Lumber: Maple select grade, clear species, maximum moisture content of 6 percent , of quality suitable for transparent finish.
  - 1. Grading: In accordance with NHLA G-101 Grading Rules; [www.nhla.org](http://www.nhla.org).
  - 2. Location: Top rail of guardrail at stairs.

## **2.04 SHEET MATERIALS**

- A. Softwood Plywood Exposed to View: Face species as indicated, plain sawn, veneer core; PS 1 Grade APA A-D; Exposure 1, glue type as recommended for application.
  - 1. Grading: Certified by the American Plywood Association.
  - 2. Location: Typical wall paneling and equipment backboards as noted in Drawings, Interior Elevations and Finish Schedule.
  - 3. Thickness: 3/4 inch, nominal, 23/32 inch actual.

## **2.05 WALL PANELS**

- A. Fiberglass Reinforced Panels - FRP.
- B. Manufacturers; Glasbord by Kemlite, Fiberlite by NUDO, Structoglas, or approved.
- C. Type; Textured surface, 0.090 inch thick, 4 x 8 foot sheet size unless noted otherwise.
- D. Accessories; vinyl molding at all edges.

- E. Color; as selected from standard color chart.

## **2.06 ADHESIVE**

- A. Adhesive: Type recommended by laminate manufacturer to suit application .

## **2.07 FASTENINGS**

- A. Fasteners for Exterior Applications: Stainless steel; length required to penetrate wood substrate 1-1/2 inch minimum.

## **2.08 ACCESSORIES**

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Wood Filler: Solvent base, tinted to match surface finish color.

## **2.09 FABRICATION**

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

### **3.02 INSTALLATION**

- A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

### **3.03 PREPARATION FOR SITE FINISHING**

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
- B. Site Finishing: See Section 09-9000.

### **3.04 TOLERANCES**

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

**END OF SECTION**



**SECTION 06-4100  
ARCHITECTURAL WOOD CASEWORK**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Specially fabricated cabinet units.
- B. Countertops.
- C. Hardware.
- D. Factory finishing.

**1.02 RELATED REQUIREMENTS**

- A. Section 01-2300 - Alternates.
- B. Section 06-1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.

**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. ANSI A135.4 - American National Standard for Basic Hardboard; 2012.
- E. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; 2009.
- F. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- G. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.
- H. BHMA A156.9 - American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association; 2010 (ANSI/BHMA A156.9).
- I. NHLA G-101 - Rules for the Measurement & Inspection of Hardwood & Cypress; National Hardwood Lumber Association; 2011.
- J. PS 1 - Structural Plywood; 2009.
- K. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2010.

**1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- C. Product Data: Provide data for hardware accessories.

### **1.05 QUALITY ASSURANCE**

- A. Perform work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Custom quality, unless other quality is indicated for specific items.

## **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.

### **2.02 LUMBER MATERIALS**

- A. Softwood Lumber: NIST PS 20; Graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Grade II/Custom; average moisture content of 5-10 percent; species as indicated on drawings.
- B. Hardwood Lumber: NHLA; Graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Grade II/Custom; average moisture content of 5-10 percent; species as indicated on drawings.

### **2.03 PANEL MATERIALS**

- A. Particleboard: ANSI A208.1; medium density industrial type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, composed of wood chips bonded with interior grade adhesive under heat and pressure; sanded faces; thickness as required; use for components indicated on drawings.
- B. Medium Density Fiberboard (MDF): ANSI A208.2; type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated; composed of wood fibers pressure bonded with moisture resistant adhesive to suit application; sanded faces; thickness as required.
- C. Plywood for Non-Decorative Purposes: NIST PS 1, Interior rated adhesives, core of seven (7) wood plies from listed species unless otherwise indicated, thickness as indicated or as required by application.
  - 1. Semi-Exposed Surfaces: APA A-B Grade, rotary cut redwood face veneer.
  - 2. Concealed Surfaces: PS 1; APA B-B Grade, rotary cut Douglas fir face veneer.
  - 3. Location: At countertops and base cabinets in all sink and lavatory locations.
- D. Hardboard: AHA A135.4; Pressed wood fiber with resin binder, Class 1 - Tempered, 1/4 inch thick, smooth two sides (S2S); use for drawer bottoms, dust panels, and other components indicated on drawings.
- E. Pre-Finished High Density Particle Board (PFHDPB)

### **2.04 LAMINATE MATERIALS**

- A. Manufacturers:

1. Wilsonart LLC: [www.wilsonart.com/#sle](http://www.wilsonart.com/#sle).
- B. Provide specific types as indicated.
1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, colors as indicated, finish as indicated.
  2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, color as selected, finish as indicated.

## 2.05 COUNTERTOPS

- A. Plastic Laminate Countertops: Medium density fiberboard substrate covered with HPDL, conventionally fabricated, with decorative 1/8 inch thick PVC edge.
- B. Solid Surfacing-Material Countertops:
1. Corian or equal.
  2. Location: refer to Drawings.

## 2.06 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Typical Plastic Edge Banding/Profile: Radius edge with thick applied band, 0.12 inch thick, 1/8 inch nominal (3 mm) radius edge with thick applied band shaped; smooth finish; of width to match component thickness, color as selected from manufacturer's standards.
1. Use at all drawer and door edges.
- C. Other Edge Banding/Profile: Impact resistant HPDL or PVC edge banding, square edge with thin applied band, 1/16 inch thick, square edge with thin applied band, flat shaped; smooth finish; of width to match component thickness
1. Use at all exposed shelf edges, casework boxes. Ease edge of banding to remove any sharp edges.
- D. Grommets: Standard plastic grommets for cut-outs, in color to match adjacent surface.

## 2.07 HARDWARE

- A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
- B. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch spacing adjustments.
- C. Countertop Supports:
1. Material: Aluminum
  2. Finish/Color: Black powdercoat.
  3. Manufacturers:
    - a. Rakks/Rangine Corporation; Sill Supports: [www.rakks.com/#sle](http://www.rakks.com/#sle)
      - 1) Surface mount EH Counter Support with rounded ends. EHR-18-18 for 24" deep counters.
    - b. Substitutions: See Section 01-6000 - Product Requirements.
- D. Drawer and Door Pulls: "U" shaped wire pull, steel with chrome finish, 4 inch centers.
- E. Catches: Touch type.
- F. Drawer Slides:
1. Type: Full extension.
  2. Static Load Capacity: Commercial grade.

3. Manufacturers:
  - a. Knap & Vogt Manufacturing Company; Light-Duty Drawer Slides:  
[www.knapeandvogt.com/#sle](http://www.knapeandvogt.com/#sle).
- G. Hinges: European style concealed self-closing type, steel with polished finish.
  1. Manufacturers:
    - a. Blum, Inc: [www.blum.com/#sle](http://www.blum.com/#sle).
- H. Cable Tray: Provide undercounter cable tray/wire management under all worksurface countertops to contain and manage power cords, data cabling, etc.
  1. Type: continuous wire tray, 4 inch wide. Secure to back wall on vertical surface above knee space.
  2. Manufacturer: Contractor choice.

## **2.08 SITE FINISHING MATERIALS**

- A. Finishing: Field finished as specified in Section 09-9000.

## **2.09 FABRICATION**

- A. Cabinet Style: Flush overlay.
- B. Cabinet Doors and Drawer Fronts: Flush style.
- C. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- D. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- E. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Locate counter butt joints minimum 2 feet from sink cut-outs.
  1. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- F. Solid Surfacing-Material: Fabricate tops on one piece, unless otherwise indicated. Comply with solid surfacing-material manufacture's written recommendations for adhesives, sealer, fabrication and finishing.
- G. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

## **2.10 FACTORY FINISHING**

- A. Finish work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Section 1500, Nitrocellulose Lacquer, Transparent.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

### **3.02 INSTALLATION**

- A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- B. Use fixture attachments in concealed locations for wall mounted components.
- C. Use concealed joint fasteners to align and secure adjoining cabinet units.
- D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- E. Secure cabinets to floor using appropriate angles and anchorages.
- F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

### **3.03 ADJUSTING**

- A. Adjust installed work.
- B. Adjust moving or operating parts to function smoothly and correctly.

### **3.04 CLEANING**

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

**END OF SECTION**

BLANK PAGE

**SECTION 07-1300  
SHEET WATERPROOFING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Sheet Waterproofing:
  - 1. Self-adhered HDPE sheet membrane, post applied.
  - 2. Butyl rubber sheet membrane.

**1.02 RELATED REQUIREMENTS**

- A. Section 03-3000 - Cast-in-Place Concrete: Concrete substrate.

**1.03 REFERENCE STANDARDS**

- A. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting 2018.
- B. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds 1998 (Reapproved 2017).
- C. ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test) 2008, with Editorial Revision (2015).
- D. ASTM D5295/D5295M - Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems 2018.
- E. ASTM D6134/D6134M - Standard Specification for Vulcanized Rubber Sheets Used in Waterproofing Systems 2007, with Editorial Revision (2019).
- F. NRCA (WM) - The NRCA Waterproofing Manual 2005.

**1.04 SUBMITTALS**

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

**1.05 FIELD CONDITIONS**

**PART 2 PRODUCTS**

**2.01 WATERPROOFING APPLICATIONS**

- A. Butyl Rubber Sheet Membrane:
  - 1. Location: At below grade concrete elevator walls and adjacent wall, see Drawings.
  - 2. Vertical Surfaces: Adhesive bonded to substrate.
  - 3. Horizontal Surfaces: Adhesive bonded to substrate.
  - 4. Cover with protection board.

## 2.02 MEMBRANE MATERIALS

- A. Self-Adhered HDPE Sheet Membrane, Post-Applied: Recommended by manufacturer for placement on outside face of below grade concrete and concrete masonry unit (CMU) backfilled walls and select horizontal applications.
  - 1. Sheet Thickness: 30 mil, 0.030 inch, minimum, and with 20 mil, 0.020 inch thick adhesive.
  - 2. Tensile Strength, Film: 5,000 psi, minimum, measured in accordance with ASTM D882.
  - 3. Lap Adhesion: 6.8 lb per inch, minimum, when tested in accordance with ASTM D1876.
  - 4. Peel Strength: 6.7 lb per inch, minimum, when tested in accordance with ASTM D903.
  - 5. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
  - 6. Manufacturers:
    - a. Tremco Commercial Sealants & Waterproofing; TREMproof 560: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
    - b. Sika SikaBit 560.
    - c. Substitutions: See Section 01-6000 - Product Requirements.
- B. Butyl Rubber Sheet Membrane: Unreinforced IIR sheet complying with ASTM D6134/D6134M, Type II.
  - 1. Thickness: 0.060 inch, minimum.
  - 2. Sheet Width: As large as is practical, with factory vulcanized splices.
  - 3. Field Seaming: Contact cement and lap edge sealant.
  - 4. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
  - 5. Flashing: Cured EPDM rubber sheet.

## 2.03 ACCESSORIES

- A. Protection Board: Provide type capable of preventing damage to waterproofing due to backfilling and construction traffic.
  - 1. Polystyrene foam board, 1 inch thick.
- B. Cant Strips: Premolded composition material.
- C. Termination Bars: Aluminum; compatible with membrane and adhesives.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify existing conditions are acceptable prior to starting this work.
- B. Verify items that penetrate surfaces to receive waterproofing are securely installed.

### 3.02 PREPARATION

- A. Concrete Surfaces for Adhesive Bonding: Prepare concrete substrate according to ASTM D5295/D5295M.
  - 1. Remove substances that inhibit adhesion including form release agents, curing compounds admixtures, laitance, moisture, dust, dirt, grease and oil.
  - 2. Repair surface defects including honeycombs, fins, tie holes, bug holes, sharp offsets, rutted cracks, ragged corners, deviations in surface plane, spalling and delaminations, as described in the reference standard.



3. Remove and replace areas of defective concrete as specified in Section 03-3000.
4. Prepare concrete for adhesive bonded waterproofing using mechanical or chemical methods described in the referenced standard.
5. Test concrete surfaces as described in the referenced standards. Verify surfaces are ready to receive adhesive bonded waterproofing membrane system.

### **3.03 INSTALLATION - MEMBRANE**

- A. Install membrane waterproofing in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
- B. Roll out membrane, and minimize wrinkles and bubbles.
- C. Self-Adhering Membrane: Remove release paper layer, and roll out onto substrate with a mechanical roller to provide full contact bond.
- D. Overlap edges and ends, minimum 3 inches, seal permanently waterproof by method recommended by manufacturer, and apply uniform bead of sealant to joint edge.
- E. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.
- F. Weather lap joints on sloped substrate in direction of drainage, and seal joints and seams.
- G. Flexible Flashings: Seal items watertight that penetrate through waterproofing membrane with flexible flashings.
- H. Seal membrane and flashings to adjoining surfaces.
  1. Install termination bar along edges.

### **3.04 INSTALLATION - DRAINAGE PANEL AND PROTECTION BOARD**

- A. Place drainage panel directly against membrane, butt joints, place to encourage drainage downward. Scribe and cut boards around projections, penetrations, and interruptions.

### **3.05 PROTECTION**

- A. Do not permit traffic over unprotected or uncovered membrane.

**END OF SECTION**

BLANK PAGE

**SECTION 07-1900  
WATER REPELLENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Water repellents applied to exterior, masonry surfaces.
- B. Pressure washing.
- C. Concrete etching.

**1.02 REFERENCE STANDARDS**

- A. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings 2005 (Reapproved 2018).
- B. ASTM D5095 - Standard Test Method for Determination of the Nonvolatile Content in Silanes, Siloxanes, and Silane-Siloxane Blends Used in Masonry Water Repellent Treatments 1991 (Reapproved 2013).
- C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition, [www.paintinfo.com](http://www.paintinfo.com).

**1.03 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description.
- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention; cautionary procedures required during application.

**1.04 FIELD CONDITIONS**

- A. Protect liquid materials from freezing.
- B. Do not apply water repellent when ambient temperature is lower than 50 degrees F or higher than 100 degrees F.
- C. Do not apply water repellents when wind velocity is higher than 8 mph.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Silane, Siloxane, Silane-Siloxane Blend, and Siliconate Water Repellents:
  - 1. FABRISHIELD by Fabrikem Manufacturing Ltd.,; Product Fabrishield 761 Silane/Siloxane Water Repellant.
  - 2. BLOK-GUARD by Sure Klean,; Product Blok-Guard & Graffiti Control II Weather Seal.
  - 3. Substitutions: See Section 01-6000 - Product Requirements.

## **2.02 MATERIALS**

- A. Water Repellent: Non-glossy, colorless, penetrating, water-vapor-permeable, non-yellowing sealer, that dries invisibly leaving appearance of substrate unchanged.
  - 1. Applications: Vertical surfaces and non-traffic horizontal surfaces.
  - 2. Number of Coats: Two.
  - 3. VOC Content: Less than 600 g/L, when tested in accordance with ASTM D3960 or ASTM D5095.
  - 4. Maintains dry appearance when wetted.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify joint sealants are installed and cured.
- C. Verify surfaces to be coated are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of water repellent.

### **3.02 PREPARATION**

- A. Protection of Adjacent Work:
  - 1. Protect adjacent landscaping, property, and vehicles from drips and overspray.
  - 2. Protect adjacent surfaces not intended to receive water repellent.
- B. Prepare surfaces to be coated as recommended by water repellent manufacturer for best results.
- C. Do not start work until masonry mortar substrate is cured a minimum of 60 days.
- D. Remove loose particles and foreign matter.
- E. Remove oil and foreign substances with a chemical solvent that will not affect water repellent.
- F. Acid etch smooth concrete surfaces to be coated, using procedures described in MPI (APSM) - Architectural Painting Specifications Manual; match approved mock-up.
- G. Allow surfaces to dry completely to degree recommended by water repellent manufacturer before starting coating work.

### **3.03 APPLICATION**

- A. Apply water repellent in accordance with manufacturer's instructions, using procedures and application methods recommended as producing the best results.
- B. Apply at a rate of 75 sq.ft./gallon by airless spray, continuously over entire surface.
- C. Apply two coats, minimum.
- D. Remove water repellent from unintended surfaces immediately by a method instructed by water repellent manufacturer.

**END OF SECTION**

BLANK PAGE

**SECTION 07-2100  
THERMAL INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Board insulation at perimeter foundation wall.
- B. Batt insulation and vapor retarder in exterior wall construction.
- C. Sound Batt Insulation in Sound Walls.
- D. Rigid Cellular Polystyrene Thermal Insulation for filling perimeter window and door shim spaces, crevices in exterior wall and roof, and at exterior wall headers.
- E. Spray Foam Insulation to bridge gaps in wall and roof insulation, typical. Refer to Drawings.

**1.02 RELATED REQUIREMENTS**

- A. Section 06-1000 - Rough Carpentry: Supporting construction for batt insulation.
- B. Section 07-5400 - Thermoplastic Membrane Roofing: Insulation specified as part of roofing system.

**1.03 REFERENCE STANDARDS**

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation 2015a.
- B. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation 2014.
- C. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2012.
- D. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials 2013.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2015a.
- F. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C 2016a.

**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.

## **1.06 LABELING REQUIREMENTS**

- A. Building Thermal Envelope Insulation:
  - 1. An R-value identification mark is applied (by manufacturer) to each piece of insulation 12 inches or greater in width.
  - 2. Alternately, the insulation installers have provided a signed, dated and posted certification listing the type, manufacturer and R-value of installation installed.
- B. Insulation Mark Installation:
  - 1. Insulation materials are installed such that the manufacturer's R-value is readily observable upon inspection.
- C. Insulation Product Rating:
  - 1. The thermal resistance (R-value) of insulation has been determined in accordance with the US FTC R-value rule.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Insulation:
  - 1. CertainTeed Corporation: [www.certainteed.com](http://www.certainteed.com).
  - 2. Johns Manville Corporation: [www.jm.com](http://www.jm.com).
  - 3. Knauf Insulation GmbH: [www.knaufinsulation.us](http://www.knaufinsulation.us).
  - 4. Owens Corning Corp: [www.owenscorning.com](http://www.owenscorning.com).
  - 5. Substitutions: See Section 016000 - Product Requirements.

### **2.02 APPLICATIONS**

- A. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.
- B. Insulation in Wood Framed Walls: Batt insulation with integral vapor retarder.
- C. Insulation in Wood Framed Ceiling Structure: Batt insulation with integral vapor retarder.
- D. Insulation behind window and door headers (interior side): Rigid, Cellular Polystyrene Thermal Insulation.
- E. Sound Insulation in Wood Framed Walls: 3 inch glass fiber sound batt insulation.

### **2.03 FOAM BOARD INSULATION MATERIALS**

- A. Extruded Polystyrene (XPS) Continuous Insulation (CI) Board: Complies with ASTM C578, and manufactured using carbon black technology.
  - 1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  - 2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  - 3. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88), minimum, per 1 inch thickness at 75 degrees F mean temperature.
  - 4. Board Size: 48 inch by 96 inch.
  - 5. Board Thickness: 3 inch, R-15 min.



6. Board Edges: Shiplap, at long edges.
7. Manufacturers:
  - a. DuPont de Nemours, Inc; STYROFOAM Brand Ultra SL (Shiplap):  
www.building.dupont.com/#sle.
  - b. Dow Chemical Company; STYROFOAM HIGHLOAD 40:  
www.dowbuildingsolutions.com/#sle.
  - c. Kingspan Insulation LLC; GreenGuard XPS Type IV, 25 psi:  
www.kingspan.com/#sle.
  - d. Owens Corning Corporation; FOAMULAR Extruded Polystyrene (XPS) Insulation:  
www.ocbuildingspec.com/#sle.
  - e. Substitutions: See Section 01-6000 - Product Requirements.

## **2.04 BATT INSULATION MATERIALS**

- A. Where batt insulation is indicated, use glass fiber batt insulation.
- B. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
- C. Batt Insulation: ASTM C 665; preformed batt; friction fit, conforming to the following:
  1. Material: Glass fiber.
  2. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
  3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
  4. Formaldehyde Content: Zero.
  5. Thermal Resistance: R of [21, 30 and 38].
  6. Thickness: 5-1/2", 9-1/2" and 12" inch, refer to Drawings for R-values locations.
    - a. Floor: R-25
    - b. Walls: R-21
    - c. Roof (attic area): R-38.
    - d. Roof insulation above deck: See Section 07-5400.
  7. Vapor Barrier Facing: Aluminum foil, flame spread 25 rated; one side (or equivalent), when not in direct contact with finish material, paper face elsewhere.
  8. Manufacturers:
    - a. CertainTeed Corporation: www.certainteed.com/#sle.
    - b. Johns Manville: www.jm.com/#sle.
    - c. Owens Corning Corporation; EcoTouch PINK FIBERGLAS Insulation:  
www.ocbuildingspec.com/#sle.
    - d. Knauf Insulation GmbH: www.knaufinsulation.us.
    - e. Owens Corning Corp: www.owenscorning.com.
  9. Substitutions: See Section 01-6000 - Product Requirements.
- D. Glass Fiber Sound Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C 665; friction fit.
  1. Density: 0.8 pcf.
  2. Thickness: 3 inch.
  3. Manufacturers:
    - a. Same as above.
  4. Locations: Typical thru-out building, except as noted for SAFB below.

## **2.05 SPRAY FOAM IN PLACE INSULATION**

- A. Foamed-In-Place Insulation: Low-density, flexible, open or closed cell, water vapor permeable polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.

- B. Thermal Resistance: R-value of 3.0, minimum, per 1 inch thickness at 75 degrees F mean temperature when tested in accordance with ASTM C518.
- C. Air Permeance: 0.04 cfm per square foot, maximum, when tested at intended thickness in accordance with ASTM E2178 at 1.57 psf.
- D. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
- E. Manufacturers:
  - 1. BASF Corporation; WALLTITE US Series Closed Cell: [www.spf.basf.com/#sle](http://www.spf.basf.com/#sle).
  - 2. Carlisle Spray Foam Insulation: [www.carlisleffi.com/#sle](http://www.carlisleffi.com/#sle).
  - 3. Henry Company: [www.henry.com/#sle](http://www.henry.com/#sle).
  - 4. Substitutions: See Section 01-6000 - Product Requirements.
- F. Primer: As required by insulation manufacturer.

## **2.06 ACCESSORIES**

- A. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
  - 1. Application: Sealing of interior circular penetrations, such as pipes or cables.
  - 2. Width: Are required for application.
- B. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch wide, at foil face vapor barrier areas, polyester elsewhere.
- C. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.
- D. Wire: Galvanized steel.
- E. Support tape: Nylon reinforced or as approved by manufacture.
- F. 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.

### **3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER**

- A. Install boards horizontally on foundation perimeter.
  - 1. Place boards to maximize adhesive contact.
  - 2. Butt edges and ends tightly to adjacent boards and to protrusions.
  - 3. Hold boards 3 inches below finish grade.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

### **3.03 BATT INSTALLATION**

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall spaces without gaps or voids. Do not compress insulation.

- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. At wood framing, place vapor retarder on warm side of insulation by stapling at 6 inches on center. Lap and seal sheet retarder joints over member face.
- F. Tape seal tears or cuts in vapor retarder.
- G. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.

#### **3.04 SOUND ATTENUATION BLANKETS**

- A. Install insulation in accordance with manufacturer's instructions.
- B. Interior stud cavity - friction fit securely between studs.
- C. Floor-Ceiling - friction fit securely between joists.
- D. Butt ends of blankets closely together and fill all voids.
- E. Location: All walls thru-out building, except at walls with thermal insulation (exterior walls).

#### **3.05 SPRAY FOAM IN PLACE INSULATION**

- A. Apply insulation in accordance with manufacturer's instructions.
- B. Apply insulation by spray method, to a uniform monolithic density without voids.
- C. Apply to achieve a thermal resistance R-value of 20.

#### **3.06 PROTECTION**

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

**END OF SECTION**

BLANK PAGE

**SECTION 07-2500  
WEATHER BARRIERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Water-Resistive Barrier: Under exterior wall cladding, over sheathing or other substrate; not air tight or vapor retardant.
- B. Vapor Retarders: Materials to make exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls water vapor resistant and air tight.

**1.02 RELATED REQUIREMENTS**

- A. Section 03-3000 - Cast-in-Place Concrete: Vapor retarder under concrete slabs on grade.
- B. Section 06-1000 - Rough Carpentry: Water-resistive barrier under exterior cladding.
- C. Section 07-2100 - Thermal Insulation: Vapor retarder installed in conjunction with batt insulation.
- D. Section 07-5400 - Thermoplastic Membrane Roofing: Vapor retarder installed as part of roofing system.
- E. Section 07-9005 - Joint Sealers: Sealant materials and installation techniques.

**1.03 DEFINITIONS**

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. 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.
- C. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
  - 1. Water Vapor Permeance: For purposes of conversion,  $57.2 \text{ ng}/(\text{Pa s sq m}) = 1 \text{ perm}$ .
- D. Water-Resistive Barrier: Water-shedding barrier made of material that is moisture resistant, to the degree specified, intended to be installed to shed water without sealed seams.

**1.04 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 2013.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2015a.
- C. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.

- D. ICC-ES AC38 - Acceptance Criteria for Water-Resistive Barriers; ICC Evaluation Service, Inc. 2013.

### **1.05 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on material characteristics.
- C. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

### **1.06 FIELD CONDITIONS**

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

## **PART 2 PRODUCTS**

### **2.01 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)**

- A. Self-Adhered Water Resistant Air Barrier Membrane:
  - 1. Air Permeance: 0.004 cubic feet per square foot, maximum, when tested in accordance with ASTM E2178.
  - 2. Water Vapor Permeance: 5 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).
  - 3. Water Vapor Permeance: 29 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).
  - 4. Dry Film Thickness: 28 mils (0.028 inch), minimum.
  - 5. Criteria for Water Resistance Barriers: Pass, when tested in accordance with ICC - ES AC38.
  - 6. Water Penetration around Nails: Pass, when tested in accordance with AAMA 711-05 and modified ASTM D 1970.
  - 7. Surface Burning Characteristics: Flame spread index of 25 or less, and smoke developed index of 50 or less, when tested in accordance with ASTM E84.
  - 8. Manufacturers:
    - a. VaproShield, LLC; WrapShield IT - Integrated Tape: [www.vaproshield.com/#sle](http://www.vaproshield.com/#sle).
    - b. Henry Company, Blueskin VP 160..
    - c. Substitutions: See Section 01-6000 - Product Requirements.

### **2.02 ACCESSORIES**

- A. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.

### **2.03 SELF-ADHERING WATERPROOFING MEMBRANE**

- A. ASTM D 1970
- B. Approved Manufacturers and Products:
  - 1. W.R. Grace Construction Products "Ice and Water Shield".
  - 2. GAF-Elk "StormGuard".
  - 3. Owens Corning "Weatherlock Flex".

4. Certainteed "Winter Guard".
5. Substitutions: See Section 01-6000 - Product Requirements.

## **2.04 SELF-ADHERING FLASHING**

- A. Manufacturer and Product:
  1. W.R. Grace Construction Products "Perm-A-Barrier".
  2. Henry Company, Blueskin SA.
  3. Substitutions: See Section 01-6000 - Product Requirements.
- B. Materials: Rubberized asphalt and polyethylene. 40 mils thickness.
- C. Location: Around all wall openings and where noted on drawings.

## **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.

### **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. Vapor Retarders: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- D. Self-Adhered Sheets:
  1. All surfaces to receive membrane must be dry and clean of oil, dust, fronts, bulk water and other contaminants that would be detrimental to adhesion of membrane. Approved adhesive -primer to be applied as recommended by Membrane manufacturer. Primer required for applications below 40 degrees, not required above 40 degrees temperature.
  2. Prepare substrate in manner recommended by sheet manufacturer; fill and tape joints in substrate and between dissimilar materials.
  3. Lap sheets shingle-fashion to shed water and seal laps air tight.
  4. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
  5. Use same material, or other material approved by sheet manufacturer for the purpose, to seal to adjacent construction and as flashing.
  6. At wide joints, provide extra flexible membrane allowing joint movement.
- E. Openings and Penetrations in Exterior Weather Barriers:
  1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.

2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
3. At openings to be filled with non-flanged frames, seal weather barrier to each side of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
4. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
5. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.
6. Refer to Drawings for additional placement requirements, and coordination placement with metal flashings.

### **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 or vapor retarders until inspections have been completed.

### **3.05 PROTECTION**

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

**END OF SECTION**



**SECTION 07-4646  
FIBER-CEMENT SIDING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fiber-cement siding.

**1.02 RELATED REQUIREMENTS**

- A. Section 07-2500 - Weather Barriers: Water-resistive barrier under siding.

**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.

**PART 2 PRODUCTS**

**2.01 FIBER-CEMENT SIDING**

- A. Panel Siding: Vertically oriented 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: Smooth.
  - 2. Length (Height): 96 inches, nominal.
  - 3. Width: 48 inches.
  - 4. Finish: Factory applied primer.
  - 5. Warranty: 50 year limited; transferable.
  - 6. Products:
    - a. James Hardie Building Products, Inc: [www.jameshardie.com/#sle](http://www.jameshardie.com/#sle).
    - b. Substitutions: See Section 01-6000 - Product Requirements.

**2.02 ACCESSORIES**

- A. Trim: Same material and texture as siding.
- B. Metal Trim: Extruded aluminum alloy 6063-T5 temper.
  - 1. Finish: paint grade.
- C. Fiber-Cement Siding Metal Trim: Extruded aluminum alloy 6063-T5 temper.

1. Dimension and Layout: As indicated on drawings.
  2. Finish: paint grade.
- D. Fasteners: Galvanized or corrosion resistant; length as required to penetrate, 1-1/4 inches, 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. Do not begin until unacceptable conditions have been corrected.
- C. 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. Use trim details as indicated on drawings.
  3. Touch up field cut edges before installing.
  4. Pre-drill nail holes if necessary to prevent breakage.
- B. Joints in Vertical Siding: Install Z-flashing in horizontal joints between successive courses of vertical siding.
- C. Do not install siding less than 6 inches from ground surface, or 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. Mechanically attached system with thermoplastic roofing membrane.
- B. Adhered system with thermoplastic roofing membrane, in select locations, primarily vertical sidewall surfaces only.
- C. Insulation, flat and tapered.
- D. High Density Insulation/Cover Board.
- E. Vapor retarder.
- F. Flashings, PVC coated.
- G. Roofing cant strips, stack boots, roofing expansion joints, and walkway pads.

**1.02 RELATED REQUIREMENTS**

- A. Section 01-2300 - Alternates: TPO in lieu of PVC.
- B. Section 06-1000 - Rough Carpentry: Wood nailers and curbs.
- C. Section 07 6200 - Sheet Metal Flashing and Trim: gutters, flashings, copings, reglets, and other accessories, flashings as shown in Drawings.

**1.03 REFERENCE STANDARDS**

- A. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board 2014.
- B. ASTM D4434/D4434M - Standard Specification for Poly(Vinyl Chloride) Sheet Roofing 2012.
- C. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.
- D. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials 2013.
- E. FM (AG) - FM Approval Guide current edition.
- F. FM DS 1-28 - Wind Design 2007.
- G. NRCA (RM) - The NRCA Roofing Manual 2017.
- H. NRCA (WM) - The NRCA Waterproofing Manual 2005.
- I. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim updates.
- J. UL (DIR) - Online Certifications Directory Current Edition.
- K. UL (FRD) - Fire Resistance Directory current edition.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week before starting work of this section.
  - 1. Review preparation and installation procedures and coordinating and scheduling required with related work.

#### **1.05 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.
- C. Specimen Warranty: For approval.
- D. 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 certification that installation complies with warranty conditions for waterproof membrane.
- E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

#### **1.06 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.

#### **1.07 WARRANTY**

- A. 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, no dollar limit.
  - 2. For repair and replacement include costs of both material and labor in warranty.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Thermoplastic Polyvinyl Chloride (PVC) Membrane Roofing Materials:
  - 1. Carlisle Roofing Systems, Inc: [www.carlisle-syntec.com/#sle](http://www.carlisle-syntec.com/#sle).
  - 2. Duro-Last Roofing, Inc. [www.duro-last.com](http://www.duro-last.com).

3. IB Roof Systems: [www.ibroof.com/#sle](http://www.ibroof.com/#sle).
4. Johns Manville: [www.jm.com/#sle](http://www.jm.com/#sle).
5. Sika Corporation Roofing; Sarnafil PVC: [usa.sarnafil.sika.com/#sle](http://usa.sarnafil.sika.com/#sle).
6. Substitutions: See Section 01-6000 - Product Requirements.

B. Insulation:

1. Same manufacturer as above or as approved by roof membrane manufacture.
2. Substitutions: See Section 01-6000 - Product Requirements.

## 2.02 ROOFING - UNBALLASTED APPLICATIONS

A. Thermoplastic Membrane Roofing: One ply membrane, mechanically fastened over roof cover board (as scheduled), insulation, over vapor barrier.

B. Roofing Assembly Requirements:

1. Roof Covering External Fire Resistance Classification: UL (FRD) Class A.
2. Factory Mutual Classification: Class 1 and windstorm resistance of 1-90, in accordance with FM DS 1-28.

C. Acceptable Insulation Types - Constant Thickness Application:

1. Single layer of polyisocyanurate/cover board.
  - a. Location: Areas scheduled for roof insulation 1/2 inch thick.
2. Minimum 2 layers of polyisocyanurate board.
  - a. Locations: Areas scheduled for roof insulation more than 1/2 inch thick.

D. Acceptable Insulation Types - Tapered Application:

1. Tapered polyisocyanurate board covered with uniform thickness glass fiber board.
2. Uniform thickness polyisocyanurate board covered with tapered polyisocyanurate or extruded polystyrene board.

## 2.03 MEMBRANE ROOFING AND ASSOCIATED MATERIALS

A. Membrane Roofing Materials:

1. PVC: Polyvinyl chloride (PVC) complying with ASTM D4434/D4434M, Type II, sheet contains reinforcing fibers or reinforcing fabrics.
2. Material: Polyvinyl chloride copolymer alloy, ethylene interpolymer, or acrylonitrile butadiene polymer complying with ASTM D4434/D4434M.
3. Reinforcing: Internal fabric.
4. Thickness: 0.060 inch, minimum.
5. Sheet Width: Factory fabricated into largest sheets possible.
6. Color: Gray.

B. Seaming Materials: As recommended by membrane manufacturer, heat welded.

C. Flexible Flashing Material: Same material as membrane.

D. PVC Coated Metal Flashing: Membrane manufacturer to provide coated metal for complete system. Refer to Detail Drawings.

## 2.04 ROOF COVER BOARD

A. Deck Sheathing: Glass mat faced gypsum panels, ASTM C 1177/C 1177M, fire resistant type, 1/4 inch thick. "Densdeck" by G-P Gypsum or equivalent.

1. Thickness: 1/4 inch, fire-resistant.
2. Manufacturers:
  - a. Georgia-Pacific; DensDeck: [www.densdeck.com/#sle](http://www.densdeck.com/#sle).

- b. National Gypsum Company; DEXcell Glass Mat Roof Board: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
- c. USG Corporation; Securock Ultralight Glass-Mat Roof Board: [www.usg.com/#sle](http://www.usg.com/#sle).
- d. Substitutions: See Section 01-6000 - Product Requirements.

## 2.05 INSULATION

- A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
  - 1. Classifications:
    - a. Type II:
      - 1) Class 1 - Faced with glass fiber reinforced cellulosic felt facers on both major surfaces of core foam.
      - 2) Compressive Strength: Classes 1-2-3, Grade 3 - 25 psi (172 kPa), minimum.
      - 3) Thermal Resistance, R-value: At 1-1/2 inch thick; Class 1, Grades 1-2-3 - 8.4 (1.48) at 75 degrees F.
  - 2. Board Size: 48 by 96 inch.
  - 3. Board Thickness: 1.0 inch, minimum.
  - 4. Tapered Board: Slope as indicated; minimum thickness 1/2 inch; fabricate of fewest layers possible.
  - 5. Board Edges: Square.
  - 6. Manufacturers:
    - a. Same as roof membrane manufacturers, or as approved by roofing manufacturer.
    - b. Substitutions: See Section 01-6000 - Product Requirements.

## 2.06 VAPOR BARRIER

- A. Air and Vapor Barrier Sheet, Self-Adhered, with Primer:
  - 1. Air Permeance: 0.001 L/s/m<sup>2</sup>, maximum, when tested in accordance with ASTM E2178.
  - 2. Water Vapor Permeance: 0.03 perms, maximum, when tested in accordance with ASTM E96/E96M, Procedure B.
  - 3. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 90 of weather exposure.
  - 4. Manufacturers:
    - a. Basis of Design: JM Vapor Barrier SA.
      - 1) Polyethylene-Reinforced, Self-Adhering SBS Vapor Barrier.
      - 2) 31.5 mil.
      - 3) Nonslip, UV-protected top surface.
      - 4) Self-sealing, SBS rubber and asphalt blend, 45 inch roll x 134 ft.
      - 5) Primer required, same manufacturer or approved by manufacturer.
    - b. Or approved by roofing manufacturer.
    - c. Substitutions: See Section 01-6000 - Product Requirements.

## 2.07 ACCESSORIES

- A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.
- B. Cant and Edge Strips: Wood fiberboard, compatible with roofing materials; cants formed to 45 degree angle.
- C. Fasteners: Appropriate for purpose intended and approved by Factory Mutual and roofing manufacturer.
- D. Membrane Adhesive: As recommended by membrane manufacturer.

- E. Thinners and Cleaners: As recommended by adhesive manufacturer, compatible with membrane.
- F. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
  - 1. Composition: Roofing membrane manufacturer's standard.
  - 2. Locate around all mechanical equipment on roof, all four sides, and as indicated in Drawings.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION - GENERAL**

- A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.
- B. Do not apply roofing membrane during unsuitable weather.
- 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.

### **3.02 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.

### **3.03 INSTALLATION - GENERAL**

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

### **3.04 VAPOR RETARDER AND VAPOR BARRIER, INSULATION & ROOF COVER BOARD**

- A. Apply primer on deck for vapor barrier installation, as required and instructed by manufacturer.
- B. Apply self-adhered vapor barrier to deck surface in accordance with manufacturer's instructions.
- C. Ensure vapor barrier is clean and dry, continuous, and ready for application of insulation.

- D. Attachment of Insulation:
  1. Mechanically fasten first layer for distance of 6 inch from roof edge.
  2. Mechanically fasten subsequent layer of insulation to deck in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.
  3. Use 5 fasteners per board, or as per manufacturer requirements, whichever is more stringent.
- E. Lay with joints staggered.24 inch minimum, or per manufacturers recommendations.
- F. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
- G. Do not apply more sheathing than can be covered with membrane in same day.
- H. Apply roof cover board, as scheduled, immediately under membrane with fasteners in accordance with manufacturer's instructions.

### **3.05 MEMBRANE APPLICATION**

- 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. All membrane sheets shall be overlapped a minimum of 6 inches to provide space for fastener and plate placement and for a continuous minimum 1-1/2 inch weld width.
- D. Fully Adhered Application: Vertical parapet application. Apply adhesive to substrate at rate of per the container gal/square. 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.
- E. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.
- F. Mechanical Attachment: Apply membrane and mechanical attachment devices in accordance with manufacturer's instructions.
- G. Welding of Lap Areas:
  1. Welding by hot air welding only.
  2. All surfaces to be welded shall be clean and dry. No adhesive shall be present in the lap areas.
  3. Follow in strict accordance with manufacturer requirements.
  4. Test and check all seams for continuity and integrity. Check seams daily. Repair openings and "fishmouths" with hand-held hot air tool and narrow nozzle tip. Pull apart several sections of seams to test quality of the welds.
  5. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.
  6. Fully adhere flexible flashing over membrane and up to nailing strips.
- H. Coordinate installation of roof drains and sumps and related flashings.

### **3.06 FIELD QUALITY CONTROL**

- A. Provide periodic on-site attendance of roofing and insulation manufacturer's representative during installation of this work.

### **3.07 CLEANING**

- A. Remove bituminous markings from finished surfaces.



- B. 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.
- C. Repair or replace defaced or damaged finishes caused by work of this section.

**3.08 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**

BLANK PAGE

**SECTION 07-6200  
SHEET METAL FLASHING AND TRIM**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

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

**1.02 RELATED REQUIREMENTS**

- A. Section 06-1000 - Rough Carpentry: Wood nailers for sheet metal work.
- B. Section 07-5400 -Thermoplastic Membrane Roofing: Roofing system.
- C. Section 07-9005 - Joint Sealers.

**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) 2015.
- B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels 2013.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2015.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2014.
- F. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing 2009.
- G. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free 2007 (Reapproved 2012).
- H. CDA A4050 - Copper in Architecture - Handbook current edition.
- I. 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.
- B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

#### **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 SHEET MATERIALS**

- A. Pre-Finished Galvanized Steel: ASTM A 653/A 653M, with G90/Z275 zinc coating; minimum 0.02 inch (24 gauge) thick base metal, shop pre-coated with modified silicone coating.
  - 1. Modified Silicone Polyester Coating: Pigmented Organic Coating System, AAMA 2603; baked enamel finish system.
  - 2. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as scheduled.
- B. Stainless Steel: ASTM A666, Type 304 alloy, soft temper, 28 gage, (0.0156 inch) thick; smooth No. 4 - Brushed finish.

#### **2.02 ACCESSORIES**

- A. Fasteners: Galvanized steel , with soft neoprene washers.
- B. Primer: Zinc chromate type.
- C. Protective Backing Paint: Zinc molybdate alkyd.
- D. Sealant to be Concealed in Completed Work: Non-curing butyl sealant.
- E. Sealant to be Exposed in Completed Work: elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.
- F. Sealant: Type 1 specified in Section 07-9005.
- G. Plastic Cement: Type I.

#### **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 (6 mm) and hemmed to form drip.
- G. Fabricate flashings to allow toe to extend 2 inches over roofing edge. Return and brake edges.

#### **2.04 GUTTER AND DOWNSPOUT FABRICATION**

- A. Gutters: SMACNA (ASMM) Rectangular profile.
- B. Accessories: Profiled to suit gutters and downspouts.
  - 1. Anchorage Devices: In accordance with SMACNA (ASMM) requirements.
  - 2. Gutter Supports: Brackets.
- C. Downspout Boots: Plastic.
- D. Seal metal joints.

### **PART 3 EXECUTION**

#### **3.01 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.

#### **3.02 INSTALLATION**

- A. Comply with drawing details.
- B. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
- C. Apply plastic cement compound between metal flashings and felt flashings.
- D. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- E. Seal metal joints watertight.
- F. Secure gutters and downspouts in place with concealed fasteners.
- G. Slope gutters 1/8 inch per foot minimum.
- H. Connect downspouts to downspout boots, and grout connection watertight.

#### **3.03 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 07-7200  
ROOF ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Roof hatches.

**1.02 RELATED REQUIREMENTS**

- A. Section 07-6200 - Sheet Metal Flashing and Trim: Roof accessory items fabricated from sheet metal.

**1.03 REFERENCE STANDARDS**

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2015.
- B. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.

**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.
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
  - 4. Maintenance requirements.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.

**PART 2 PRODUCTS**

**2.01 ROOF HATCHES AND VENTS**

- A. Roof Hatch Manufacturers:
  - 1. Bilco Company; Type S Roof Hatch - Ladder Access: [www.bilco.com/#sle](http://www.bilco.com/#sle).
  - 2. Dur-Red Products: [www.dur-red.com](http://www.dur-red.com).
  - 3. Milcor, Inc: [www.milcorinc.com](http://www.milcorinc.com).
  - 4. Substitutions: See Section 01-6000 - Product Requirements.
- B. Roof Hatches and Smoke Vents: Factory-assembled galvanized steel frame and cover, complete with operating and release hardware.
  - 1. Style: Provide flat metal covers unless otherwise indicated.
  - 2. For Ladder Access: Single leaf; 36 by 36 inches, field very exact size.

- C. Frames and Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
  - 1. Material: Galvanized steel, 14 gage, 0.0747 inch thick.
  - 2. Finish: Factory prime paint.
  - 3. Insulation: Manufacturer's standard; 1 inch rigid glass fiber, located on outside face of curb.
  - 4. Curb Height: 12 inches from finished surface of roof, minimum.
- D. Metal Covers: Flush, insulated, hollow metal construction.
  - 1. Capable of supporting 40 psf live load.
  - 2. Material: Galvanized steel; outer cover 14 gage, 0.0747 inch thick, liner 22 gage, 0.03 inch thick.
  - 3. Finish: Factory prime paint.
  - 4. Insulation: Manufacturer's standard 1 inch rigid glass fiber.
  - 5. Gasket: Neoprene, continuous around cover perimeter.
- E. Hardware: Type 316 stainless steel, unless otherwise indicated or required by manufacturer.
  - 1. Lifting Mechanisms: Compression or torsion spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf load.
  - 2. Hinges: Heavy duty pintle type.
  - 3. Hold open arm with vinyl-coated handle for manual release.
  - 4. Latch: Upon closing, engage latch automatically and reset manual release.
  - 5. Manual Release: Pull handle on interior.
  - 6. Locking: Padlock hasp on interior.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

### **3.04 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 07-9005  
JOINT SEALERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Sealants and joint backing.

**1.02 RELATED REQUIREMENTS**

- A. Section 07-2500 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders:
- B. Section 09-2116 - Gypsum Board Assemblies: Acoustic sealant.

**1.03 REFERENCE STANDARDS**

- A. ASTM C834 - Standard Specification for Latex Sealants 2014.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2014.
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants 2013.
- D. SCAQMD 1168 - Adhesive and Sealant Applications 1989 (Amended 2017).
- E. ASTM C 1521 Standard Practice for Evaluating Adhesion of Installed Weatherproofing Joint Sealants.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with other sections referencing this section.

**1.05 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

**1.06 FIELD CONDITIONS**

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

**PART 2 PRODUCTS**

**2.01 SEALANTS**

- A. General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25 minimum; Uses M, G, and A; single component.
  - 1. Color: color as selected.
  - 2. Product: Sonolastic NP-1 manufactured by BASF.
  - 3. Applications: Use for:

- a. Control, expansion, and soft joints in masonry.
  - b. Joints between concrete and other materials.
  - c. Joints between metal frames and other materials.
  - d. Joints at wood siding and trim as indicated.
  - e. Other exterior joints for which no other sealant is indicated.
4. Test Data:
- a. Movement capability, % - +100 to -50.
  - b. Tensile strength - 250 psi.
  - c. Ultimate elongation at break, % - 1000.
  - d. Hardness, Shore A - passes 25 - 30.
- B. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
- 1. Color: Match adjacent finished surfaces.
  - 2. Product: Sonalac manufactured by BASF.
  - 3. Applications: Use for:
    - a. Interior wall and ceiling control joints.
    - b. Joints between door and window frames and wall surfaces.
    - c. Other interior joints for which no other type of sealant is indicated.

## **2.02 ACCESSORIES**

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

### **3.02 PREPARATION**

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

### **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 the following, unless otherwise indicated:
  - 1. Width/depth ratio of 2:1.
  - 2. Neck dimension no greater than 1/3 of the joint width.
  - 3. Surface bond area on each side not less than 75 percent of joint width.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave.

### **3.04 CLEANING**

- A. Clean adjacent soiled surfaces.

### **3.05 PROTECTION**

- A. Protect sealants until cured.

### **3.06 SCHEDULE**

- A. Exterior Joints for Which No Other Sealant Type is Indicated: Type 1 .
- B. Interior Joints for Which No Other Sealant is Indicated: Type 2; .

**END OF SECTION**

BLANK PAGE

**SECTION 08-1113  
HOLLOW METAL DOORS AND FRAMES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Hollow metal frames for wood doors.
- B. Hollow metal borrowed lites glazing frames.
- C. Accessories, including glazing, louvers, and louvers.

**1.02 RELATED REQUIREMENTS**

- A. Section 08-7100 - Door Hardware.

**1.03 ABBREVIATIONS AND ACRONYMS**

- A. HMMA: Hollow Metal Manufacturers Association.
- B. NFPA: National Fire Protection Association.
- C. UL: Underwriters Laboratories.

**1.04 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- 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) 2017.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames 2011.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2015.
- 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 2016.
- 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 2017.
- I. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete 2012.
- J. ASTM C476 - Standard Specification for Grout for Masonry 2010.

- K. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames 2016.
- L. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- M. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames 2002.
- N. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames 2011.
- O. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames 2007.
- P. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames 2014.

### **1.05 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- C. Maintain at project site copies of reference standards relating to installation of products specified.

### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

## **PART 2 PRODUCTS**

### **2.01 PERFORMANCE REQUIREMENTS**

- A. Requirements for Hollow Metal Doors and Frames:
  1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
  2. Accessibility: Comply with ICC A117.1 and ADA Standards.
  3. Door Top Closures: Flush end closure channel, with top and door faces aligned.
  4. Door Edge Profile: Manufacturers standard for application indicated.
  5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturer's standard.

6. 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.
  7. 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.

## **2.02 HOLLOW METAL FRAMES**

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Exterior Door Frames: Face welded type.
  1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
  2. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
  3. Weatherstripping: Separate, see Section 08-7100.
- C. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.
- D. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.

## **2.03 FINISHES**

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

## **2.04 ACCESSORIES**

- A. Louvers: Roll formed steel with overlapping frame; finish same as door components ; factory-installed.
  1. Style: Standard straight slat blade.
- B. Door Window Frames: Door window frames with glazing securely fastened within door opening.
  1. Size: As indicated on drawings.
  2. Frame Material: 18 gauge, 0.0478 inch, galvanized steel.
  3. Metal Finish: Dark Bronze polyester powder coating.
  4. Glazing: 1/4 inch thick, tempered glass, in compliance with requirements of authorities having jurisdiction.
- C. Glazing: As specified in Section 08-8000, factory installed.
- D. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.
- E. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.

- F. 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.
- G. 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. Coordinate frame anchor placement with wall construction.
- C. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- D. 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.
- E. Coordinate installation of electrical connections to electrical hardware items.

#### **3.04 TOLERANCES**

- A. 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; fire-rated and 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.
- D. Section 09-9000 - Painting and Coating.

**1.03 REFERENCE STANDARDS**

- A. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2012.
- B. ICC (IBC) - International Building Code; 2012.
- C. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2019.
- D. 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. Warranty, executed in Owner's name.

**1.05 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.

**1.06 WARRANTY**

- A. See Section 01-7800 - Closeout Submittals, for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for 2 years.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Wood Veneer Faced Doors:
- B. Wood Veneer Faced Doors:
  - 1. Graham Wood Doors: [www.grahamdoors.com](http://www.grahamdoors.com).
  - 2. Eggers Industries: [www.eggersindustries.com/#sle](http://www.eggersindustries.com/#sle).
  - 3. Haley Brothers: [www.haleybros.com/#sle](http://www.haleybros.com/#sle).
  - 4. Marshfield Door Systems, Inc: [www.marshfielddoors.com](http://www.marshfielddoors.com).
  - 5. VT Industries, Inc: [www.vtindustries.com](http://www.vtindustries.com).
  - 6. Oregon Door: [www.oregondoor.com](http://www.oregondoor.com).
  - 7. Lynden Door: [www.lyndendoor.com](http://www.lyndendoor.com).
  - 8. Substitutions: See Section 01-6000 - Product Requirements.

### **2.02 DOORS**

- A. Doors: Refer to drawings for locations and additional requirements.
  - 1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with WDMA I.S. 1A.
  - 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.

### **2.03 DOOR AND PANEL CORES**

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

### **2.04 DOOR FACINGS**

- A. Veneer Facing for Transparent Finish: White oak, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with plank match between leaves of veneer, balance match of spliced veneer leaves assembled on door or panel face.

### **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.

## **2.06 FACTORY FINISHING - WOOD VENEER DOORS**

- A. Finish work in accordance with WDMA I.S. 1A for grade specified and as follows:
  - 1. Transparent:
    - a. System - TR-2, Catalyzed Lacquer.
    - b. Stain: As selected by Architect, to match existing doors.
    - c. Sheen: Satin.
- B. Factory finish doors in accordance with specified quality standard:
  - 1. Transparent Finish: Transparent conversion varnish, Premium quality, high gloss sheen.

## **2.07 ACCESSORIES**

- A. Hollow Metal Door Frames: See Section 08-1113.
- B. Glazed Openings:
  - 1. Heat-Strengthened and Fully Tempered Glass: ASTM C1048.
  - 2. Glazing: Single vision units, 1/4 inch thick glass.
  - 3. Tint: Clear.
- C. Door Window Frames: Door window frames with glazing securely fastened within door opening.
  - 1. Size: As indicated on drawings.
  - 2. Frame Material: 18 gauge, 0.0478 inch, galvanized steel.
  - 3. Metal Finish: Dark Bronze polyester powder coating.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that opening sizes and tolerances are acceptable.
- B. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

### **3.02 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
  - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.

### **3.03 TOLERANCES**

- A. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over an imaginary 36 by 84 inches surface area.
- B. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to bottom, over an imaginary 36 by 84 inches surface area.

- C. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 by 84 inches surface area.

**3.04 ADJUSTING**

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

**3.05 SCHEDULE**

- A. Refer to Door Schedule in Drawings and Hardware Schedule appended to Section 08-7100.

**END OF SECTION**

**SECTION 08-3326  
OVERHEAD COILING GRILLES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Overhead coiling metal grilles and operating hardware, manual operation, key switch and at counter grilles, manual operation, "pull rod".

**1.02 RELATED REQUIREMENTS**

- A. Section 01-2300 - Alternates.
- B. Section 06-2000 - Finish Carpentry: Wood jamb and head trim.

**1.03 REFERENCE STANDARDS**

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.
- C. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric] 2013.

**1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide general construction, component connections and details, and electrical equipment.
- C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Overhead Coiling Grilles:
  - 1. The Cookson Company: [www.cooksondoor.com/#sle](http://www.cooksondoor.com/#sle).
  - 2. Wayne-Dalton, a Division of Overhead Door Corporation: [www.waynedalton.com](http://www.waynedalton.com).
  - 3. Overhead Door Co.
  - 4. Basis of Design: Overhead Door, Upward Coiling Security Grille, Model 670.
  - 5. Substitutions: See Section 01-6000 - Product Requirements.

**2.02 GRILLE AND COMPONENTS**

- A. Curtain: Round horizontal bars connected with vertical links.
  - 1. Horizontal bars: 5/16 inch diameter.

2. Bar spacing: 2 inch on center.
  3. Tube spacers: 1/2 inch diameter.
  4. Spacer spacing: 3-1/4 inch on center.
  5. Link spacing: 6 inch on center.
  6. Bar Ends: Provide with nylon runners for quiet operation.
  7. Pattern: straight lattice pattern on 12 inch on center.
  8. Bottom Bar: Back-to-back angles with tubular resilient cushion. At between the jamb mounted counter top grilles, provide tubular aluminum bottom bar with cylinder lock, opposite coil side (cafeteria side).
- B. Lock Hardware:
1. Latchset Lock Cylinders: Standard mortise cylinder.
    - a. Keying: Alike.
  2. Slide Bolt: Provide on single-jamb side, extending into slot in guides, with padlock on one side.
- C. Sizes: Refer to Drawings. Field verify exact size. Nominal size for bidding only: 2'-8" wide by 4'-6" high opening.

### **2.03 MATERIALS**

- A. Aluminum: ASTM B221 (ASTM B221M).
- B. Stainless Steel: ASTM A666 Type 304, with rollable temper.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install grille unit assembly in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

### **3.02 TOLERANCES**

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

### **3.03 ADJUSTING**

- A. Adjust grille, hardware and operating assemblies for smooth and noiseless operation.

### **3.04 CLEANING**

- A. Clean grille and components.
- B. Remove labels and visible markings.

**END OF SECTION**

BLANK PAGE



**SECTION 08-4229  
AUTOMATIC ENTRANCES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Packaged power-operated door assemblies of following types:
  - 1. Swinging type.
- B. Operators for doors provided in other sections.
- C. Controllers, actuators and safety devices.
- D. Maintenance.

**1.02 RELATED REQUIREMENTS**

- A. Door and Hardware Schedules.

**1.03 REFERENCE STANDARDS**

- A. BHMA A156.10 - American National Standard for Power Operated Pedestrian Doors 2017.
- B. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

**1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
  - 1. Indicate layout and dimensions; head, jamb, and sill conditions; elevations; components, anchorage, recesses, materials, and finishes, electrical characteristics and connection requirements.
- C. Product Data: Provide data on system components, sizes, features, and finishes.
- D. Manufacturer's Qualification Statement.
- E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience, and a member of AAADM.

**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.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Door Operators for Swing Doors Specified in Other Sections:
  - 1. Horton Automatics; HD Swing: [www.hortondoors.com](http://www.hortondoors.com).
  - 2. Stanley Access Technologies: [www.stanleyaccess.com/#sle](http://www.stanleyaccess.com/#sle).
  - 3. Substitutions: See Section 01-6000 - Product Requirements.

### **2.02 OPERATORS FOR SWINGING DOORS**

- A. Door Operator, Type HD-Swing, 4100 bottom access: Electric, surface mounted overhead.
  - 1. Operation: Full-power open, spring close operation.
  - 2. Variable speed control for opening and closing cycles.
  - 3. "Push" Side Actuator: Push plate.
  - 4. "Pull" Side Actuator: Push plate.
  - 5. Dual Side Actuator: jamb style Push plate - LCN
  - 6. Operator housing: 6 inch high, 4-1/2 inches wide, aluminum prefinished.

### **2.03 CONTROLLERS, ACTUATORS, AND SAFETIES**

- A. Controller: Provide microprocessor operated controller for each door.
- B. Comply with BHMA A156.10 for actuator and safety types and zones.
- C. Push Plate Actuator: Standard wall mounted, surface mounted momentary contact type; satin stainless steel plate; 6 inches diameter; labeled International Symbol, and PUSH, model C1260-4.

### **2.04 ELECTRICAL CHARACTERISTICS AND COMPONENTS**

- A. Electrical Characteristics:
  - 1. 15 rated load amperes.
  - 2. 120 volts, single phase, 60 Hz.
- B. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.
- C. Disconnect Switch: Factory mount disconnect switch in control panel.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive work and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available and is of the correct characteristics.

### **3.02 INSTALLATION**

- A. Install equipment in accordance with manufacturer's instructions.

- B. Coordinate installation of components with related and adjacent work; level and plumb.

**3.03 ADJUSTING**

- A. Adjust door equipment for correct function and smooth operation.

**3.04 CLEANING**

- A. Remove temporary protection, clean exposed surfaces.

**3.05 CLOSEOUT ACTIVITIES**

- A. Demonstrate operation, operating components, adjustment features, and lubrication requirements.

**3.06 MAINTENANCE**

- A. Provide service and maintenance of operating equipment for one year from Date of Substantial Completion, at no extra charge to Owner.

**END OF SECTION**

BLANK PAGE

**SECTION 08-4313  
ALUMINUM-FRAMED STOREFRONTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames, interior only.
- C. Weatherstripping.
- D. Door hardware.

**1.02 RELATED REQUIREMENTS**

- A. Section 01-2300 - Alternates.
- B. Section 08-4229 - Automatic Entrances.
- C. Section 08-7100 - Door Hardware: Hardware items other than specified in this section.

**1.03 REFERENCE STANDARDS**

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site 2015.
- B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2012.
- C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.
- D. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric] 2013.
- E. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2004 (Reapproved 2012).
- F. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.
- G. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2016).

**1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

**1.05 QUALITY ASSURANCE**

- A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

## **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.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Aluminum-Framed Storefronts Manufacturers:
  - 1. Arcadia, Inc: [www.arcadiainc.com/#sle](http://www.arcadiainc.com/#sle).
  - 2. Kawneer North America: [www.kawneer.com/#sle](http://www.kawneer.com/#sle).
  - 3. Substitutions: See Section 01-6000 - Product Requirements.

### **2.02 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING**

- A. Center-Set Style, Thermally-Broken:
  - 1. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.

### **2.03 STOREFRONT**

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
  - 1. Finish: Class II natural anodized.
    - a. Factory finish all surfaces that will be exposed in completed assemblies.
  - 2. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
  - 3. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
  - 4. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
  - 5. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
  - 6. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
  - 7. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- B. Performance Requirements:
  - 1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
    - a. Positive Design Wind Load: 35 lbf/sq ft.
    - b. Negative Design Wind Load: 35 lbf/sq ft.
    - c. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.

2. Water Penetration Resistance: No leakage when tested in accordance with ASTM E331 at a minimum static air pressure differential of 8 psf as defined in AAMA 501.
3. Air Leakage: Maximum air leakage rate of 0.06 cu ft/min sq ft, when tested in accordance with ASTM E283 at a static air pressure differential of 6.2 psf with interior seal.

#### **2.04 COMPONENTS**

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
  1. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
- B. Glazing: As specified in Section 08-8000.
- C. Swing Doors: Glazed aluminum.
  1. Thickness: 1-3/4 inches.
  2. Top Rail: 3-1/2 inches wide.
  3. Vertical Stiles: 3-1/2 inches wide.
  4. Bottom Rail: 10 inches wide.

#### **2.05 MATERIALS**

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Fasteners: Stainless steel.

#### **2.06 FINISHES**

- A. Class II Natural Anodized Finish: AAMA 611 AA-M12C22A31 Clear anodic coating not less than 0.4 mils thick.
- B. Color: Clear.

#### **2.07 HARDWARE**

- A. For each door, include weatherstripping.
- B. Other Door Hardware: As specified in Section 08-7100.
- C. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- D. Pivots: Offset type; top and bottom.
- E. Push/Pull Set: Standard configuration push/pull handles.
- F. Exit Devices: Panic type, dog-down capability. Motorized retracting bolt, coordinate with Access Control system. Kawneer 1686 EL or equal.
- G. Power Supply: Coordinate style and manufacturer with motorized panic.
- H. Door Closers: Concealed overhead.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

### **3.02 INSTALLATION**

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install hardware using templates provided.
  - 1. See Section 08-7100 for hardware installation requirements.
  - 2. See Section 08-4229 for operator and actuator installation requirements.
- G. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

### **3.03 ADJUSTING**

- A. Adjust operating hardware and sash for smooth operation.

### **3.04 CLEANING**

- A. Remove protective material from pre-finished aluminum surfaces.

### **3.05 PROTECTION**

- A. Protect installed products from damage until Date of Substantial Completion.

**END OF SECTION**



**SECTION 08-7100  
DOOR HARDWARE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Hardware for wood and hollow metal doors.
- B. Hardware for fire-rated doors.
- C. Electrically operated and controlled hardware.
- D. Lock cylinders for doors that hardware is specified in other sections.
- E. Thresholds.
- F. Weatherstripping, seals and door gaskets.

**1.02 RELATED REQUIREMENTS**

- A. Section 08-1113 - Hollow Metal Doors and Frames.
- B. Section 08-1416 - Flush Wood Doors.
- C. Section 08-4229 - Automatic Entrances: Hardware for same except cylinders; installation of cylinders.
- D. Section 08-4229 - Automatic Entrances: Power operators.
- E. Section 08-4313 - Aluminum-Framed Storefronts: Hardware for doors in storefront, including:
  - 1. Integral weatherstripping.

**1.03 REFERENCE STANDARDS**

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- B. BHMA A156.1 - American National Standard for Butts and Hinges 2016.
- C. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches 2017.
- D. BHMA A156.3 - American National Standard for Exit Devices 2014.
- E. BHMA A156.4 - American National Standard for Door Controls - Closers 2013.
- F. BHMA A156.6 - American National Standard for Architectural Door Trim 2015.
- G. BHMA A156.7 - American National Standard for Template Hinge Dimensions 2016.
- H. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders 2015.
- I. BHMA A156.13 - American National Standard for Mortise Locks & Latches Series 1000 2017.

- J. BHMA A156.17 - American National Standard for Self Closing Hinges & Pivots 2014.
- K. BHMA A156.18 - American National Standard for Materials and Finishes 2016.
- L. BHMA A156.21 - American National Standard for Thresholds 2014.
- M. BHMA A156.22 - American National Standard for Door Gasketing and Edge Seal Systems Sponsor 2017.
- N. BHMA A156.31 - American National Standard for Electric Strikes and Frame Mounted Actuators 2013.
- O. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames 2016.
- P. BHMA A156.115W - American National Standard for Hardware Preparation in Wood Doors with Wood or Steel Frames 2006.
- Q. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames 2004.
- R. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors 1993; also in WDHS-1/WDHS-5 Series, 1996.
- S. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2019.
- T. NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- U. UL (DIR) - Online Certifications Directory Current Edition.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware will be installed upon.

#### **1.05 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project.
- C. Shop Drawings:
  1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts, electrical characteristics and connection requirements .
  2. Submit manufacturer's parts lists and templates.
- D. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Identify electrically operated items and include power requirements.
- E. Keying Schedule: Submit for approval of Owner.

#### **1.06 QUALITY ASSURANCE**

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

## **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

## **PART 2 PRODUCTS**

### **2.01 DOOR HARDWARE - GENERAL**

- A. Provide hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.
- B. Provide items of a single type of the same model by the same manufacturer.
- C. Provide products that comply with the following:
  - 1. Applicable provisions of federal, state, and local codes.
  - 2. Fire-Rated Doors: NFPA 80.
  - 3. Hardware on Fire-Rated Doors, Except Hinges: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.
  - 4. Hardware for Smoke and Draft Control Doors (Indicated as "S" on Drawings): Provide hardware that enables door assembly to comply with air leakage requirements of the applicable code.
  - 5. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.
- D. Function: Lock and latch function numbers and descriptions of manufactures series as listed in hardware schedule.
- E. Electrically Operated and/or Controlled Hardware: Provide all power supplies, power transfer hinges, relays, and interfaces required for proper operation; provide wiring between hardware and control components and to building power connection.
- F. Finishes: Provide door hardware of the same finish unless otherwise indicated.
  - 1. Primary Interior Finish: Satin chrome plated over nickel on brass or bronze, 626 (approx US26D).
    - a. Location: Interior doors.
  - 2. Primary Exterior Finish: Stainless steel, satin, 630.
    - a. Location: Exterior doors.
  - 3. Finish Definitions: BHMA A156.18.
  - 4. Exceptions:
    - a. Where base metal is specified to be different, provide finish that is an appearance equivalent according to BHMA A156.18.
    - b. Hinges for Fire-Rated Doors: Steel base metal with painted finish.

### **2.02 LOCKS AND LATCHES**

- A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
  - 1. If no hardware set is indicated for a swinging door provide an office lockset.
  - 2. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
  - 3. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
- B. Lock Cylinders: Manufacturer's standard tumbler type, six-pin standard core.

1. Provide cams and/or tailpieces as required for locking devices required.
- C. Keying: Keyed in like-groups.
1. Key to existing keying system.
  2. When providing keying information, comply with DHI Handbook "Keying systems and nomenclature".
- D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".
- E. Privacy Latchset - Mortise Style;
1. Basis of Design: L9496 Px17A by Schlage.
  2. Privacy lock with ADA thumbturn and "vacant/occupied" indicator.

### **2.03 HINGES**

- A. Hinges - Basis of Design: FBB179 or FBB199, Stanley.
- B. Self Closing Hinges: Comply with BHMA A156.17.
- C. Hinges: Provide hinges on every swinging door.
1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
  2. Provide ball-bearing hinges at all doors having closers.
  3. Provide hinges in the quantities indicated.
  4. Provide non-removable pins on exterior outswinging doors.
  5. Where electrified hardware is mounted in door leaf, provide power transfer hinges.
- D. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7; standard weight, unless otherwise indicated.
- E. Quantity of Hinges Per Door:
1. Doors up to 60 inches High: Two hinges.
  2. Doors From 60 inches High up to 90 inches High: Three hinges.
  3. Doors 90 inches High up to 120 inches High: Four hinges.
  4. Doors 42 inches Wide up to 90 inches High: Four Hinges.
- F. Manufacturers - Hinges:
1. Assa Abloy Brands; McKinney: [www.assaabloydss.com](http://www.assaabloydss.com).
  2. Ives Architectural Hardware.
  3. Bommer Industries, Inc: [www.bommer.com](http://www.bommer.com).
  4. C. R. Laurence Company, Inc: [www.crl-arch.com/sle](http://www.crl-arch.com/sle).
  5. Hager Companies: [www.hagerco.com](http://www.hagerco.com).
  6. Stanley Black & Decker: [www.stanleyblackanddecker.com](http://www.stanleyblackanddecker.com).

### **2.04 PUSH/PULLS**

- A. Push/Pulls - Basis of Design: Ives.
- B. Push/Pulls: Comply with BHMA A156.6.
1. Provide push and pull on doors not specified to have lockset, latchset, exit device, or auxiliary lock.
  2. On solid doors, provide matching push plate and pull plate on opposite faces.
- C. Manufacturers - Push/Pulls:
1. Assa Abloy McKinney or Ives.
  2. C. R. Laurence Company, Inc: [www.crl-arch.com/sle](http://www.crl-arch.com/sle).
  3. Substitutions: See Section 01-6000 - Product Requirements.

## **2.05 LOCKS AND LATCHES**

- A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
  - 1. Hardware Sets indicate locking functions required for each door.
  - 2. If no hardware set is indicated for a swinging door provide an office lockset.
  - 3. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
  - 4. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
- B. Lock Cylinders: Manufacturer's standard tumbler type, six-pin standard core.
  - 1. Provide cams and/or tailpieces as required for locking devices required.
- C. Keying: Grand master keyed.
- D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

## **2.06 CYLINDRICAL LOCKSETS**

- A. Cylindrical Locksets - Basis of Design: Schlage ND Series.
- B. Locking Functions: As defined in BHMA A156.2, and as follows.
  - 1. Passage: No locking, always free entry and exit.
  - 2. Privacy: F76, emergency tool unlocks.
  - 3. Office: F81, key not required to lock, remains locked upon exit.
  - 4. Classroom: F84, key required to lock.
  - 5. Intruder Classroom: F110, keyed both sides.
  - 6. Communicating: F80 or F113.
  - 7. Hotel: F93.
  - 8. Store Room Function: F86, key required to lock, may not be left unlocked.
- C. Manufacturers - Cylindrical Locksets:
  - 1. Schlage, an Allegion brand: [www.allegion.com/us](http://www.allegion.com/us).
  - 2. Substitutions: See Section 01-6000 - Product Requirements.

## **2.07 MORTISE LOCKSETS**

- A. Mortise Locksets - Basis of Design: Schlage L Series.
- B. Locking Functions: As defined in BHMA A156.13, and as follows:
  - 1. Passage: F01.
  - 2. Privacy: F19, or F02 with retraction of deadbolt by use of inside lever/knob.
    - a. Occupied indicator for single user toilet rooms, shower rooms.
  - 3. Office: F04, key not required to lock, remains locked upon exit.

## **2.08 SURFACE LOCKSETS**

- A. Yale V80 Standard Security Latchlock.
- B. Location: steel fabricated gate.

## **2.09 ELECTRIC STRIKES**

- A. Electric Strikes: Complying with BHMA A156.31 and UL (DIR) listed as a Burglary-Resistant Electric Door Strike; style to suit locks.
- B. Manufacturers - Electric Strikes:
  - 1. Assa Abloy Brands, HES; 5200: [www.assaabloydss.com](http://www.assaabloydss.com).
  - 2. Substitutions: See Section 01-6000 - Product Requirements.

## **2.10 EXIT DEVICES**

- A. Exit Devices - Basis of Design: Von Duprin 98/99 Series Exit Devices.
- B. Locking Functions: Functions as defined in BHMA A156.3, and as follows:
  - 1. Entry/Exit, Always-Unlocked: Outside lever unlocked, no outside key access, no latch holdback.
  - 2. Entry/Exit, Free Swing: Key outside retracts latch, latch holdback (dogging) for free swing during occupied hours, not fire-rated; outside trim must be specified as lever or pull.
  - 3. Entry/Exit, Always-Latched: Key outside locks and unlocks lever, no latch holdback (dogging).
  - 4. Entry/Exit, Always-Locked: Key outside retracts latchbolt but does not unlock lever, no latch holdback.
  - 5. Exit Only, Secure: No outside trim, no key entry, no latch holdback, deadlocking latchbolt.
- C. Manufacturers - Exit Devices:
  - 1. Von Duprin, an Allegion brand: [www.allegion.com/us](http://www.allegion.com/us).
  - 2. Substitutions: See Section 01-6000 - Product Requirements.

## **2.11 CLOSERS**

- A. Closers - Basis of Design: LCN 4010 Series, or 281 Sargent.
- B. Closers: Complying with BHMA A156.4.
  - 1. Provide surface-mounted, door-mounted closers unless otherwise indicated.
  - 2. Provide a door closer on every exterior door.
  - 3. Provide a door closer on every fire- and smoke-rated door. Spring hinges are not an acceptable self-closing device unless specifically so indicated.
  - 4. On pairs of swinging doors, if an overlapping astragal is present, provide coordinator to ensure the leaves close in proper order.
- C. Manufacturers - Surface Mounted Closers:
  - 1. LCN, an Allegion brand: [www.allegion.com/us](http://www.allegion.com/us).
  - 2. Substitutions: See Section 01-6000 - Product Requirements.

## **2.12 STOPS AND HOLDERS**

- A. Stops: Complying with BHMA A156.8; provide a stop for every swinging door, unless otherwise indicated.
  - 1. Provide wall stops, unless otherwise indicated.
  - 2. If wall stops are not practical, due to configuration of room or furnishings, provide overhead stop.
  - 3. Stop is not required if positive stop feature is specified for door closer; positive stop feature of door closer is not an acceptable substitute for a stop unless specifically so stated.

- B. Kick Down Holder: Ives FS 452.
- C. Wall Stops: Ives WS406/407CCV, concave wall bumper.
- D. Door Guard: Ives 481 Change Door Guard.
- E. Manufacturers - Wall and Floor Stops/Holders:
  - 1. Assa Abloy Brands, McKinney: [www.assaabloydss.com](http://www.assaabloydss.com).
  - 2. Ives.
    - a. 407-1/2 Wall Stops.
    - b. FS 452 Holdopen.
  - 3. Substitutions: See Section 01-6000 - Product Requirements.

### **2.13 GASKETING, THRESHOLDS AND DOOR PROTECTION**

- A. Gasketing and Thresholds - Basis of Design: Pemko.
- B. Gaskets: Complying with BHMA A156.22.
  - 1. On each door in smoke partition, provide smoke gaskets; top, sides, and meeting stile of pairs. If fire/smoke partitions are not indicated on drawings, provide smoke gaskets on each door identified as a "smoke door" and 20-minute rated fire doors.
    - a. Pemko S88D.
  - 2. On each exterior door, provide weatherstripping gaskets, unless otherwise indicated; top, sides, and meeting stiles of pairs.
    - a. Where exterior door is also required to have fire or smoke rating, provide gaskets functioning as both smoke and weather seals.
    - b. Pemko 303 AV.
  - 3. On each exterior door, provide door bottom sweep, unless otherwise indicated; 216AV Pemko.
  - 4. On each exterior door, provide door top; 346AV Pemko.
  - 5. On doors indicated as "sound-rated", "acoustical", or with an STC rating, provide sound-rated gaskets and automatic door bottom; make gaskets completely continuous, do not cut or notch gaskets for installation.
    - a. Door Bottom Seal: 4301 ARL, Pemko.
    - b. Threshold/carpet Separator: 174A Pemko.
    - c. Sound Seal: S88D, Pemko.
- C. Thresholds: Complying with BHMA A156.21.
  - 1. At each exterior door, provide a threshold unless otherwise indicated, 6 inch wide typical, unless detailed otherwise.
  - 2. Field cut threshold to frame for tight fit.
  - 3. Pemko 1716 A.
- D. Fasteners At Exterior Locations: Non-corroding.

### **2.14 PROTECTION PLATES AND ARCHITECTURAL TRIM**

- A. Protection Plates:
  - 1. Kickplate: Provide on push side of every door with closer, except aluminum storefront and glass entry doors.
- B. Drip Guard: Provide projecting drip guard over all exterior doors unless they are under a projecting roof or canopy.
  - 1. Assa Abloy Pemko Door Top 346.
- C. Manufacturers - Protection Plates and Architectural Trim:

1. Assa Abloy Brands, McKinney: [www.assaabloydss.com](http://www.assaabloydss.com).
2. Ives.
3. Substitutions: See Section 01-6000 - Product Requirements.

## **2.15 GENERAL REQUIREMENTS FOR DOOR HARDWARE PRODUCTS**

- A. Provide products that comply with the following:
  1. Applicable provisions of Federal, State, and local codes.

## **2.16 KEYING**

- A. Door Locks: Grand master keyed.
- B. Supply keys in the following quantities:
  1. 2 master keys.
  2. 5 grand master keys.
  3. 3 change keys for each lock.

## **2.17 KEY CABINET**

- A. Cabinet Construction: Sheet steel construction, piano hinged door with cylinder type lock master keyed to building system.
- B. Cabinet Size: Size for project keys plus 50 percent growth.
- C. Horizontal metal strips for key hook labelling with clear plastic strip cover over labels.
- D. Finish: Baked enamel, color as selected.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available to power operated devices and of the correct characteristics.

### **3.02 INSTALLATION**

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Use templates provided by hardware item manufacturer.
- C. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.
- D. Mounting heights for hardware from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Sets Schedule or on drawings.
  1. For steel doors: Comply with DHI (LOCS) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames".
  2. For Wood Doors: Comply with DHI WDHS.3 "Recommended Locations for Architectural Hardware for Flush Wood Doors".
  3. Locksets: 38 inch.
  4. Push/Pulls: 42 inch.



5. Dead Locks: 42 inch.

- E. Set exterior door thresholds with full-width bead of elastomeric sealant on each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

### **3.03 ADJUSTING**

- A. Adjust work under provisions of Section 01-7000 - Execution and Closeout Requirements.

### **3.04 CLEANING**

- A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

### **3.05 PROTECTION**

- A. Protect finished Work under provisions of Section 01-7000 - Execution and Closeout Requirements.
- B. Do not permit adjacent work to damage hardware or finish.

### **3.06 HARDWARE SCHEDULE - ATTACHED AT END OF THIS SECTION.**

## **HARDWARE SETS**

### **4.01 HARDWARE SETS - GENERAL**

- A. These Hardware Sets indicate requirements for single doors of that type, with conditional requirements for pairs and other situations.
- B. Pairs of Swinging Doors: Provide one of each specified item on each leaf unless specifically stated otherwise. Treat pairs as two active leaves unless otherwise indicated.
- C. HW-CYL: Doors whose hardware is specified in other sections but which must be keyed to building system:
1. Lock Cylinder, Mortise, keyed to building system.

### **4.02 SWING DOORS -- NOT REQUIRING KEY LOCKING**

- A. HW-2: Latchset, Non-Fire-Rated.
1. Hinges.
  2. Latchset, Passage.
  3. Wallstop.
- B. HW-5: Privacy Lockset, Non-Fire-Rated:
1. Hinges.
  2. Mortise Lockset, Privacy.
  3. Wall stop.

### **4.03 SWING DOORS -- LOCKABLE, MAY BE LEFT UNLOCKED, KEY NOT REQUIRED TO LOCK**

- A. HW-10: Office, Non-Fire-Rated:
  - 1. Hinges.
  - 2. Lockset, Office.
  - 3. Wallstop.

**4.04 SWING DOORS -- KEY REQUIRED TO LOCK, MAY BE LEFT UNLOCKED**

- A. HW-20: Classroom Lock, Non-Fire-Rated:
  - 1. Lockset, Classroom.
  - 2. Hinges.
  - 3. Wall stop.
- B. HW-26: Existing Door - Motorized Operator, Fire-Rated and non-Fire-Rated:
  - 1. Panic Device, or lever - existing.
  - 2. Closer - Existing.
  - 3. Motorized Operator.
  - 4. Holdopen.
  - 5. Weatherstrip
  - 6. Threshold.
- C. HW-28: Storefront Door and Frame: non-Fire-Rated:
  - 1. Lockset.
  - 2. Remainder of Hardware per 08-4313.

**4.05 SWING DOORS -- MAY NOT BE LEFT UNLOCKED**

- A. HW-30: Always-Locked, Non-Fire-Rated:
  - 1. Surface Lockset, Always-Locked.
  - 2. Hinges.
  - 3. Wall stop.

**END OF SECTION**

**SECTION 08-8000  
GLAZING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Glass.
- B. Select Mirrors.
- C. Glazing compounds and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 05-7311 - Decorative Metal and Glazed Metal Railings: infill 1/2 inch laminated safety glass specified.
- B. Section 07-9005 - Joint Sealers: Sealant and back-up material.
- C. Section 08-1113 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.
- D. Section 08-1416 - Flush Wood Doors: Glazed lites in doors.
- E. Section 08-4313 - Aluminum-Framed Storefronts: Glazing furnished by storefront manufacturer.

**1.03 REFERENCE STANDARDS**

- A. ASTM C1036 - Standard Specification for Flat Glass 2011.
- B. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2012.
- C. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings 2012a.
- D. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation 2010.

**1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

**1.05 FIELD CONDITIONS**

- A. Do not install glazing when ambient temperature is less than 50 degrees F.

**1.06 WARRANTY**

- A. See Section 01-7800 - Closeout Submittals, for additional warranty requirements.
- B. Sealed Insulating Glass Units: Provide a five (5) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

## **PART 2 PRODUCTS**

### **2.01 INSULATING GLASS UNITS**

- A. Type IG-1 - Sealed Insulating Glass Units: Vision glass, double glazed.
  - 1. Application: All exterior glazing unless otherwise indicated.
  - 2. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
    - a. Tint: Clear.
    - b. Coating: Low-E (passive type), on #2 surface.
    - c. U-value: 0.35 max.
    - d. Solar Heat Gain Coefficient (SHGC): .40 max.
  - 3. Inboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
    - a. Tint: Clear.
  - 4. Total Thickness: 1 inch.
    - a. Argon filled.
    - b. 1/2 inch air space.

### **2.02 GLAZING UNITS**

- A. Type E-1 - Single Exterior Vision Glazing:
  - 1. Application: Hollow Metal Doors only.
  - 2. Type: Fully tempered float glass.
  - 3. Tint: Clear.
  - 4. Thickness: 1/4 inch.
- B. Type S-1 - Single Vision Glazing:
  - 1. Application: All interior glazing unless otherwise indicated.
  - 2. Type: Fully tempered float glass.
  - 3. Tint: Clear.
  - 4. Thickness: 1/4 inch.

### **2.03 EXTERIOR GLAZING ASSEMBLIES**

- A. Performance Criteria: Select type and thickness of glass to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of glass.
  - 1. Use the procedure specified in ASTM E1300 to determine glass type and thickness.
  - 2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
  - 3. Glass thicknesses listed are minimum.

### **2.04 GLASS MATERIALS**

- A. Float Glass Manufacturers:
  - 1. PPG Industries, Inc: [www.ppgideascape.com](http://www.ppgideascape.com).
  - 2. American-Saint Gobain Corp.
  - 3. Libbey-Owens-Ford Glass Co.
  - 4. Pittsburg Plate Glass Co.
  - 5. Viracon.

6. Cardinal Glass Industries.
7. Technical Glass Products.
8. Substitutions: Refer to Section 01-6000 - Product Requirements.

- B. Float Glass: Provide float glass based glazing unless noted otherwise.
1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
  2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and Kind FT.
  3. Tinted Types: ASTM C1036, Class 2 - Tinted, color and performance characteristics as indicated.
  4. Thicknesses: As indicated; for exterior glazing comply with requirements indicated for wind load design regardless of thickness indicated.

## **2.05 SEALED INSULATING GLASS UNITS**

- A. Sealed Insulating Glass Units: Types as indicated.
1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
  2. Edge Spacers: Aluminum, bent and soldered corners.
  3. Edge Seal: Glass to elastomer with supplementary silicone sealant.
  4. Purge interpane space with dry hermetic air.

## **2.06 MIRRORS**

- A. Mirror Design Criteria: Select materials and/or provide supports as required to limit mirror material deflection to 1/200, or to the flexure limit of glass, with full recovery of glazing materials, whichever is less.
- B. Mirror Glass: Clear, annealed float glass; ASTM C1036, with copper and silver coatings, and protective overcoating.
1. Thickness: 1/4 inch.
  2. Edges: Arrised.
  3. Size: As indicated on drawings.
- C. Channel Frame: One piece, channel frame, stainless steel, Type 430, satin finish, 1/2 inch by 1/2 inch by 3/8 inch deep with 90 degree mitered corners.

## **2.07 GLAZING COMPOUNDS**

- A. 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.

## **2.08 GLAZING ACCESSORIES**

- A. Setting Blocks: Neoprene, 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 x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- B. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; hardness range of 5 to 30 cured Shore A durometer; coiled on release paper; black color.
- C. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; matching color.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that openings for glazing are correctly sized and within tolerance.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

### **3.02 PREPARATION**

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.
- D. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.
- E. Install sealants in accordance with manufacturer's instructions.

### **3.03 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)**

- A. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

### **3.04 INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)**

- A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- D. Place glazing tape on free perimeter of glazing in same manner described above.
- E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- F. Knife trim protruding tape.

### **3.05 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.

### **3.06 CLEANING**

- A. Remove glazing materials from finish surfaces.

- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

**3.07 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.

**END OF SECTION**

BLANK PAGE



**SECTION 09-2116  
GYPSUM BOARD ASSEMBLIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Performance criteria for gypsum board assemblies.
- B. Gypsum sheathing.
- C. Cementitious backing board.
- D. Gypsum wallboard.
- E. Abuse resistant wallboard.
- F. Joint treatment and accessories.
- G. Prime paint on walls and ceilings to receive textured finish.
- H. Textured finish system.
- I. Acoustic (sound-dampening) wall and ceiling board.

**1.02 RELATED REQUIREMENTS**

- A. Section 06-1000 - Rough Carpentry: Building framing and sheathing.
- B. Section 06-1000 - Rough Carpentry: Wood blocking product and execution requirements.
- C. Section 07-2100 - Thermal Insulation: Acoustic insulation.
- D. Section 07-2500 - Weather Barriers: Water-resistive barrier over sheathing.
- E. Section 07-9005 - Joint Sealers: Acoustic sealant.

**1.03 REFERENCE STANDARDS**

- A. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units 2018.
- B. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board 2017.
- C. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing 2003 (Reapproved 2009).
- D. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members 2018.
- E. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products 2018.
- F. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board 2019b.

- G. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs 2018.
- H. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base 2019.
- I. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2013.
- J. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing 2018.
- K. ASTM C1288 - Standard Specification for Discrete Non-Asbestos Fiber-Cement Interior Substrate Sheets 2017.
- L. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2014.
- M. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2012.
- N. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009.
- O. ASTM E413 - Classification for Rating Sound Insulation 2016.
- P. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015.
- Q. GA-216 - Application and Finishing of Gypsum Panel Products 2016.
- R. GA-600 - Fire Resistance Design Manual 2015.
- S. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- T. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems Current Edition, Including All Revisions.

#### **1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on gypsum board and accessories.

### **PART 2 PRODUCTS**

#### **2.01 GYPSUM BOARD ASSEMBLIES**

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Fire Rated Assemblies: Provide completed assemblies complying with applicable code.
  1. ICC IBC Item Numbers: Comply with applicable requirements of ICC IBC for the particular assembly.
  2. Gypsum Association File Numbers: Comply with requirements of GA-600 for the particular assembly.

#### **2.02 BOARD MATERIALS**

- A. Manufacturers - Gypsum-Based Board:
  - 1. American Gypsum: [www.americangypsum.com](http://www.americangypsum.com).
  - 2. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - 3. Georgia-Pacific Gypsum: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
  - 4. National Gypsum Company: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
  - 5. USG Corporation: [www.usg.com/#sle](http://www.usg.com/#sle).
  - 6. Substitutions: See Section 01-6000 - Product Requirements.
  
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
  - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
  - 2. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  - 3. Thickness:
    - a. Vertical Surfaces: 5/8 inch.
    - b. Ceilings: 5/8 inch.
  - 4. Mold Resistant Paper Faced Products:
    - a. CertainTeed Corporation; ProRoc Brand Moisture & Mold Resistant Gypsum Board.
  
- C. Backing Board For Wet Areas:
  - 1. Application: Surfaces behind tile in wet areas including restrooms.
  - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  - 3. ASTM Cement-Based Board: Non-gypsum-based, cementitious board complying with ASTM C1288.
    - a. Thickness: 1/2 inch.
    - b. Products:
      - 1) James Hardie Building Products, Inc: [www.jameshardie.com/#sle](http://www.jameshardie.com/#sle).
      - 2) CertainTeed Fiber Cement Backerboard.
      - 3) Substitutions: See Section 01-6000 - Product Requirements.
  
- D. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
  - 1. Application: Vertical surfaces behind thinset tile, except in wet areas, and all areas behind sinks, lavatory sinks, mop sinks, etc.
  - 2. Type: Regular and Type X, in locations indicated.
  - 3. Type X Thickness: 5/8 inch.
  - 4. Regular Board Thickness: 5/8 inch.
  - 5. Edges: Tapered.
  
- E. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
  - 1. Application: Ceilings, unless otherwise indicated.
  - 2. Thickness: 5/8 inch.
  - 3. Edges: Tapered.
  
- F. Acoustical Sound Dampening Wall and Ceiling Board: Two layers of heavy paper-faced, high-density gypsum board separated by a viscoelastic polymer layer and capable of achieving STC rating of 50 or more in typical stud wall assemblies as calculated in accordance with ASTM E413 and when tested in accordance with ASTM E90.
  - 1. Thickness: 5/8 inch.
  - 2. Long Edges: Tapered.
  - 3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  - 4. Products:

- a. CertainTeed Corporation; SilentFX Quick Cut Gypsum Board:  
www.certainteed.com/#sle.
  - b. CertainTeed Corporation; SilentFX Quick Cut Type X Gypsum Board:  
www.certainteed.com/#sle.
  - c. National Gypsum Company; Gold Bond SoundBreak XP Gypsum Board:  
www.nationalgypsum.com/#sle.
  - d. Or as listed in Drawings.
  - e. Substitutions: See Section 01-6000 - Product Requirements.
- G. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
- 1. Application: Exterior sheathing, unless otherwise indicated.
  - 2. Fungal Resistance: No fungal growth when tested in accordance with ASTM G21.
  - 3. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
  - 4. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  - 5. Core Type: Regular and Type X, as indicated.
  - 6. Type X Thickness: 5/8 inch.
  - 7. Regular Board Thickness: 1/2 inch.
  - 8. Edges: Square.
  - 9. Glass Mat Faced Products:
    - a. American Gypsum Company; M-Glass Exterior Sheathing Type X:  
www.americangypsum.com/#sle.
    - b. CertainTeed Corporation; GlasRoc Type X Exterior Sheathing:  
www.certainteed.com/#sle.
    - c. National Gypsum Company; Gold Bond eXP Sheathing:  
www.nationalgypsum.com/#sle.
    - d. USG Corporation; USG Securock Brand Ultralight Glass-Mat Sheathing Firecode X: www.usg.com/#sle.
    - e. Substitutions: See Section 01-6000 - Product Requirements.

### 2.03 ACCESSORIES

- A. Acoustic Insulation: As specified in Section 07-2100.
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- C. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.
- D. Water-Resistive Barrier: See Section 07-2500.
- E. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
- F. Decorative Metal Trim:
  - 1. Material: Extruded aluminum alloy 6063-T5 temper.
  - 2. Finish: Anodized, clear.
  - 3. Type: F, L and J. See Drawings for additional information.
  - 4. Profile as selected from manufacturer's standard range.
  - 5. Manufactures:
    - a. Tamlyn
    - b. Fry Reglet
    - c. Substitutions: See Section 01-6000-Product Requirements.

- G. Ceiling Pockets with Prewired Raceway: UL 325 listed, extruded aluminum shade pocket with removable closure panel and ceiling tile support, for recess mounting in acoustical tile or drywall ceilings; size and configuration as indicated on drawings.
  - 1. Designed to accommodate installation of motor control and wiring accessories within pocket.
- H. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
- I. High Build Drywall Surfer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.
- J. 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.
- K. Adhesive for Attachment to Wood ASTM C557 and Wood ASTM C557:

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that project conditions are appropriate for work of this section to commence.

#### **3.02 ACOUSTIC ACCESSORIES INSTALLATION**

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
  - 1. Place one bead continuously on substrate before installation of perimeter framing members.
  - 2. Place continuous bead at perimeter of each layer of gypsum board.
  - 3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

#### **3.03 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. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
- E. Cementitious Backing Board: Install over wood framing members where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.
  - 1. Shim 1/8 inch as needed to flush with adjacent gypsum board surfaces.

#### **3.04 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.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.
- D. Decorative Trim: Install at locations shown on drawings and in accordance with manufacturer's instructions.

### **3.05 JOINT TREATMENT**

- A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
  - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
  - 2. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
  - 3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
  - 4. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- B. 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.
- C. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

### **3.06 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 09-2400  
CEMENT PLASTERING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Cement plastering.

**1.02 RELATED REQUIREMENTS**

- A. Section 06-1000 - Rough Carpentry: Wood stud framing for plaster.
- B. Section 09-9000 - Exterior Painting

**1.03 REFERENCE STANDARDS**

- A. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire 2009a (Reapproved 2014).
- B. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process 2019.
- C. ASTM C150/C150M - Standard Specification for Portland Cement 2015.
- D. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes 2006 (Reapproved 2011).
- E. ASTM C897 - Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters 2015 (Reapproved 2020).
- F. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster 2020.
- G. ASTM C1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster 2019a.
- H. ASTM C933 - Standard Specification for Welded Wire Lath 2018.
- I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2015a.

**1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements for submittals procedures.

**1.05 QUALITY ASSURANCE**

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

**1.06 FIELD CONDITIONS**

- A. Exterior Plaster Work: Do not apply plaster when substrate or ambient air temperature is 40 degrees F or lower, or when temperature is expected to drop below 40 degrees F within 48 hours of application.

## **PART 2 PRODUCTS**

### **2.01 CEMENT PLASTER APPLICATIONS**

- A. Lath Plaster Base: Metal lath.
  - 1. Plaster Type: Factory prepared plaster mix.
  - 2. Number of Coats: Three.
  - 3. First Coat: Apply to a nominal thickness of 3/8 inch.
  - 4. Leveling Coat: Apply to a nominal thickness of 1/32 to 1/16 inch.
  - 5. Finish Coat: Apply to a nominal thickness of 1/8 inch.

### **2.02 FACTORY PREPARED CEMENT PLASTER**

- A. Exterior Portland cement plaster system made of scratch and brown base coat, leveling coat with reinforcing mesh, and acrylic finish coat; install in accordance with ASTM C926.
  - 1. Provide continuous exterior insulation as part of the system, by the same manufacturer.
  - 2. Provide weather resistive barrier as part of the system, by the same manufacturer.
- B. Premixed One-Coat Base: Mixture of Type I Portland cement complying with ASTM C150/C150M, hydrated lime complying with ASTM C207, fibers and other approved ingredients; install in accordance with ASTM C926.

### **2.03 ACCESSORIES**

- A. Lath:
  - 1. Wire Size: 17 gauge, 0.453 inch.
  - 2. Galvanized: ASTM A641/A641M.
  - 3. Opening Size: 11/16 by 1-1/2 inches.
  - 4. Comply with ASTM C933.
- B. Finishing Accessories: ASTM C1063; extruded aluminum alloy (6063 T5), galvanized steel sheet ASTM A924/A924M G90, rolled zinc, or rigid plastic, unless noted otherwise.
  - 1. Types: As detailed or required for finished appearance.
- C. Rainscreen Drainage Material:
  - 1. Rainscreen Drainage Mat: Polyester or polypropylene mesh.
    - a. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less (Class A), when tested in accordance with ASTM E84.
    - b. Seam Tape and Bug Screen: As recommended by rainscreen drainage mat manufacturer.
    - c. Manufacturers:
      - 1) Greenguard DC14 Drainage Mat.
      - 2) Keene Building Products: [www.keenebuilding.com/#sle](http://www.keenebuilding.com/#sle).
      - 3) Mortar Net Solutions: [www.mortarnet.com/#sle](http://www.mortarnet.com/#sle).
      - 4) Substitutions: See Section 01-6000 - Product Requirements.

## **PART 3 EXECUTION**



### **3.01 EXAMINATION**

- A. Verify existing conditions are acceptable prior to starting this work.
- B. Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are properly in place.
- C. Verify mechanical and electrical equipment and services located within areas to receive this work have been properly tested and approved.

### **3.02 INSTALLATION - WATER-RESISTIVE BARRIER**

- A. Where cement plaster is installed as part of a barrier wall system, install two layers of water-resistive barrier in accordance with water-resistive barrier manufacturer's instructions.
- B. Integrate water-resistive barrier with flashing accessories, and adjacent doors, windows, penetrations, and cladding transitions.
- C. Apply water-resistive barrier horizontally with upper layer lapped over lower layer at least 2 inches.
- D. Lap water-resistive barrier at least 6 inches at vertical joints.
- E. Lap water-resistive barrier at least 16 inches beyond vertical line of inside and outside corners in both directions.

### **3.03 INSTALLATION - RAINSCREEN DRAINAGE MATERIAL**

- A. Install rainscreen drainage material and metal lath with accessories over sheathing material and water-resistive barrier with fastening system in accordance with ASTM C1063 into wood or metal studs. Install drainage material with filter fabric mortar screen to exterior.

### **3.04 MIXING**

- A. Mix only as much plaster as can be used prior to initial set.
- B. Mix materials dry, to uniform color and consistency, before adding water.
- C. Protect mixtures from frost or freezing temperatures, contamination, and excessive evaporation.

### **3.05 APPLICATION**

- A. Apply plaster in accordance with manufacturer's written instructions and comply with ASTM C926.
- B. Base Coats:
  - 1. Apply base coat(s) to fully embed lath and to specified thickness.
  - 2. Follow guidelines in ASTM C926 and manufacturer's written installation instructions for moist curing base coats and application of subsequent coats.
- C. Leveling Coat:
  - 1. Apply leveling coat to specified thickness.
  - 2. Fully embed reinforcing mesh in leveling coat.
- D. Finish Coats:
  - 1. Cement Plaster:

- a. Apply with sufficient material and pressure to ensure complete coverage of base to specified thickness.
- b. Apply desired surface texture while mix is still workable.

**3.06 TOLERANCES**

- A. Maximum Variation from True Flatness: 1/4 inch in 10 feet.

**3.07 REPAIR**

- A. Patching: Remove loose, damaged or defective plaster and replace with plaster of same composition; finish to match surrounding area.

**END OF SECTION**

**SECTION 09-3000  
TILING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Tile for wall applications.
- B. Non-ceramic trim.

**1.02 REFERENCE STANDARDS**

- A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium) 2019.
- B. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation 2019.

**1.03 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Product Sample: provide two samples of each tile type.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. Extra Tile: 10 square feet of each size, color, and surface finish combination.

**1.04 QUALITY ASSURANCE**

- A. Maintain one copy of and ANSI A108/A118/A136.1 and TCNA (HB) on site.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

**1.06 FIELD CONDITIONS**

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

**PART 2 PRODUCTS**

**2.01 TILE**

- A. Manufacturers: All products by the same manufacturer.
  - 1. Marazzi: <https://www.marazziusa.com>
  - 2. Dal-Tile Corporation: [www.daltile.com/#sle](http://www.daltile.com/#sle).

3. Or approved.
- B. Porcelain Tile, Type (T): ANSI A137.1, standard grade.
1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
  2. Size: 4 by 12 inch, nominal.
  3. Thickness: 3/8 inch.
  4. Edges: Square.
  5. Surface Finish: Satin
  6. Color(s): To be selected by Architect from manufacturer's standard range.
  7. Style: Basis of Design - Dal Tile "Perpetuo".
  8. Products:
    - a. Dal-Tile Corporation; \_\_\_\_\_: [www.daltile.com/#sle](http://www.daltile.com/#sle).
    - b. Substitutions: See Section 01-6000 - Product Requirements.

## 2.02 TRIM AND ACCESSORIES

- A. Non-Ceramic Trim: Satin natural anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
1. Applications:
    - a. Open edges of wall tile.
      - 1) Top of wall tile: Schluter - JOLLY
      - 2) Bottom of wall tile, adjacent to cove resilient base:
    - b. Wall corners, outside and inside.
      - 1) Outside corner: Schluter - RONDEC
      - 2) Inside corner: not required.
  2. Manufacturers:
    - a. Schluter-Systems: [www.schluter.com/#sle](http://www.schluter.com/#sle).
    - b. Or approved.

## 2.03 ADHESIVE MATERIALS

- A. Manufacturers:
1. Bonsal American, Inc: [www.sakrete.com](http://www.sakrete.com)
  2. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  3. Or approved.
- B. Organic Adhesive: ANSI A136.1, thinset bond type; use Type I in areas subject to prolonged moisture exposure.

## 2.04 MORTAR MATERIALS

- A. Manufacturers:
1. Custom Building Products: [www.custombuildingproducts.com](http://www.custombuildingproducts.com).
  2. Or approved.
- B. Mortar Bond Coat Materials for Thin-Set Installations:
1. Dry-Set Portland Cement type: ANSI A118.1.
  2. Latex-Portland Cement type: ANSI A118.4.

## 2.05 GROUTS

- A. Manufacturers:
1. Custom Building Products: [www.custombuildingproducts.com](http://www.custombuildingproducts.com).
  2. Or approved.

- B. Standard Grout: Any type specified in ANSI A118.6 or A118.7.
- C. Color: To be selected out of manufactures standard range.

## **2.06 ACCESSORY MATERIALS**

- A. Backer Board: Cementitious type complying with ANSI A118.9; high density, glass fiber reinforced, 1/2 inch thick; 2 inch wide coated glass fiber tape for joints and corners.
  - 1. Products:
    - a. Custom Building Products; WonderBoard Lite Backerboard: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
    - b. CertainTeed Fiber Cement Backerboard.
    - c. Substitutions: See Section 01-6000 - Product Requirements.
- B. Mesh Tape: 2 inch wide self-adhesive fiberglass mesh tape.

## **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 tile.

### **3.02 PREPARATION**

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.
- E. Install cementitious backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge.
- F. Install tile backer board in strict accordance with manufacturer's instructions, using galvanized roofing nails or corrosion-resistant bugle head drywall screws. Bed fiberglass self-adhesive tape at all joints and corners with material used to set tiles.
- G. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

### **3.03 INSTALLATION - GENERAL**

- A. Install tile and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.13, manufacturer's instructions, and TCNA (HB) recommendations.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align wall joints.

- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install ceramic accessories rigidly in prepared openings.
- G. Install non-ceramic trim in accordance with manufacturer's instructions.
- H. Sound tile after setting. Replace hollow sounding units.
- I. Keep control and expansion joints free of mortar, grout, and adhesive.
- J. Keep expansion joints free of adhesive or grout. Apply sealant to joints.
- K. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- L. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.
- M. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.
- N. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

#### **3.04 INSTALLATION - WALL TILE**

- A. Over fiber-cement backer board units install in accordance with TCNA (HB) Method W244F-15.

#### **3.05 CLEANING**

- A. Clean tile and grout surfaces.

#### **3.06 PROTECTION**

- A. Do not permit traffic over finished floor surface for 4 days after installation.

**END OF SECTION**

**SECTION 09-5153  
DIRECT-APPLIED ACOUSTICAL CEILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Acoustic units.
- B. Perimeter trim.

**1.02 REFERENCE STANDARDS**

- A. ASTM E1264 - Standard Classification for Acoustical Ceiling Products 2019.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Sequence work to ensure acoustic 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. Install acoustic units after interior wet work is dry.

**1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on acoustic units.
- C. Samples: Submit two samples, 12 by 12 inch in size, illustrating material and finish of acoustic units.
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. Extra Acoustical Units: Quantity equal to 5 percent of total installed
- F. LEED Submittal: Documentation of recycled content and location of manufacture.

**1.05 FIELD CONDITIONS**

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after installation.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Acoustic Panel:
  - 1. Acoustical Surfaces, Inc..
  - 2. Acoustical Solutions, Inc..

3. Or approved.

## **2.02 MATERIALS**

- A. Acoustical Panel, Type AP-1: Fire Class A with the following characteristics:
  1. Size: 24 x 48 inches.
  2. Thickness: 1 inches.
  3. Composition: Polyester. 60% PET-recycled min..
  4. Light Reflectance: 0.88 min. percent, determined in accordance with ASTM E1264.
  5. NRC Range: 0.70 to 0.8, determined in accordance with ASTM E1264.
  6. Surface Color: White.
  7. Surface Pattern: Smooth
- B. Acoustical Panel, Type[AP-2]: Fire Class A with the following characteristics:
  1. Size: 24 x 48 inches.
  2. Thickness: 1 inches.
  3. Composition: Polyester. 60% PET-recycled min..
  4. Light Reflectance: 0.88 min. percent, determined in accordance with ASTM E1264.
  5. NRC Range: 0.70 to 0.8, determined in accordance with ASTM E1264.
  6. Surface Color: White.
  7. Surface Pattern: Smooth
- C. Acoustical Panel, Type[AP-3]: Fire Class A with the following characteristics:
  1. Size: 48x48 inches.
  2. Thickness: 1 inches.
  3. Composition: Polyester. 60% PET-recycled min..
  4. Light Reflectance: 0.88 min. percent, determined in accordance with ASTM E1264.
  5. NRC Range: 0.70 to 0.8, determined in accordance with ASTM E1264.
  6. Surface Color: White.
  7. Surface Pattern: Smooth
- D. Adhesive: Waterproof, gun grade; type recommended by manufacturer.
- E. Perimeter Moldings: aluminum profile, see details, manufacture standard color.

## **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**

- A. Install system in accordance with manufacturer's instructions.
- B. Perimeter Molding:
  1. Use longest practical lengths.
- C. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.
- D. Install acoustic units level in uniform plane.
- E. Layout per Reflected Ceiling Plan



**END OF SECTION**

BLANK PAGE

**SECTION 09-6433  
LAMINATED WOOD FLOORING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Laminated wood flooring at stair treads, landing, and bench.
- B. Installation accessories.

**1.02 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Laminated Wood Flooring:
  - 1. Construction: Tongue and groove, self-locking, 5-ply laminated wood planks.
  - 2. Installation Method: Secured with countersunk exposed fasteners as shown in Drawings  
Gluedown at landing.
  - 3. Species: White Oak.
  - 4. Color: As selected from manufacturer's full range for species specified above.
  - 5. Thickness: 3/4 inch.
  - 6. Face Width: 3 inch.
  - 7. Edge Profile: Square.
  - 8. Length: Full length of tread, approximately 48 inches. Random length at intermediate  
landing and bench seat.
  - 9. Length: Random, minimum of 9 inches.
  - 10. Treatment: Acrylic impregnated.
  - 11. Finish: Factory applied, UV cured urethane.
- B. Vapor Retarder: Polyethylene sheet, 6 mil thick; 2 inch wide polyethylene tape for sealing  
joints.

**2.02 ACCESSORIES**

- A. Subfloor Filler: White premix latex. Type recommended by adhesive material manufacturer.
- B. Adhesives: Water-resistant; types recommended by flooring manufacturer for project  
substrates.
- C. Divider and Edge Strip: Angle mill finish aluminum.
- D. Transition Strip: Same species and finish as flooring material; profiles indicated.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that sub-floor surfaces are smooth and flat within the tolerances required for type of substrate and ready to receive laminated wood flooring.
- B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of materials to substrate surface.
- C. Verify that wood sub-floors have 12 percent or less moisture content.
- D. Verify that required floor-mounted utilities are in correct location.

### **3.02 PREPARATION**

- A. Prepare sub-floor in accordance with flooring manufacturer's installation instructions.
- B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is fully cured.
- D. Vacuum clean substrate.

### **3.03 INSTALLATION**

- A. Vapor Retarder: Install loose laid, seams overlapped 4 inches and sealed with polyethylene tape. Run material 2 inches up the wall and trim after flooring is installed.
- B. Adhesives: Install in accordance with adhesive manufacturer's installation instructions.
- C. Wood Flooring:
  - 1. Install flooring in accordance with manufacturer's installation instructions.
  - 2. Lay flooring parallel to width of room areas. Verify alignment as work progresses.
  - 3. Install edge strips at unprotected or exposed edges, and where flooring terminates.
  - 4. Provide 1/2 inch expansion space at fixed walls and other interruptions.

### **3.04 CLEANING**

- A. Remove excess adhesive from floor, base, and wall surfaces without damaging surfaces.
- B. Clean floor surfaces in accordance with the flooring manufacturer's instructions.

### **3.05 PROTECTION**

- A. Prohibit traffic on finished floor for 24 hours after installation.
- B. Place protective coverings over finished floors; do not remove coverings until after Date of Substantial Completion.

**END OF SECTION**

**SECTION 09-6500  
RESILIENT FLOORING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Resilient sheet flooring (RS).
- B. Resilient tile, Luxury Vinyl Tile (LVT) flooring.
- C. Cove base.
- D. Resilient base (RB).
- E. Resilient stair coverings and accessories (RST/R).
- F. Installation accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 03-3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors.
- B. INTERIOR FINISH SCHEDULE located in Drawings.

**1.03 REFERENCE STANDARDS**

- A. ASTM F970 - Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading 2017.
- B. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing 2004 (Reapproved 2014).
- C. ASTM F1861 - Standard Specification for Resilient Wall Base 2016.
- D. ASTM F2034 - Standard Specification for Sheet Linoleum Floor Covering 2018.
- E. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings 2011.

**1.04 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. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01-6000 - Product Requirements, for additional provisions.

**1.05 FIELD CONDITIONS**

- A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- B. 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 SHEET FLOORING**

- A. Vinyl Sheet Flooring Type (RS): Homogeneous; color and pattern throughout wear layer thickness, with backing, and:
  - 1. Manufacturers:
    - a. Armstrong Flooring. <https://www.armstrongflooring.com/en-us>
    - b. Substitutions: See Section 01-6000 - Product Requirements.
  - 2. Wear Layer Thickness: .075 in min.
  - 3. Total Thickness: .075 inch min. inch minimum.
  - 4. Sheet Width: 72 inch minimum.
  - 5. Static Load Resistance: 250 psi minimum, when tested as specified in ASTM F970.
  - 6. Heat welded seams with color matched rod.
  - 7. Integral coved base with cap strip.
  - 8. Product / Style: See Finish List.
  - 9. Color: To be selected by Architect from manufacturer's full range.

### **2.02 TILE FLOORING**

- A. Luxury Vinyl Tile (LVT): Surface-decorated, with wear layer.
  - 1. Manufacturers:
    - a. Milliken.
    - b. J&J Flooring. <https://www.jjflooringgroup.com/product-category/lvt/>
    - c. Substitutions: See Section 01-6000 - Product Requirements.
  - 2. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.
  - 3. Warranty: 10 year minimum
  - 4. Plank Tile Size: TBD
  - 5. Wear Layer Thickness: 20 mil, (2.0 mm).
  - 6. Total Thickness: 0.100 inch.
  - 7. Product / Style: See Finish List.
  - 8. Color: to be selected by Architect from manufactures full range.
  - 9. Layout Pattern: TBD

### **2.03 STAIR COVERING**

- A. Integral Stair Treads / Riser: Rubber; full width and depth of stair tread and riser in one piece; tapered thickness. Stair Skirt to match Rubber base.
  - 1. Manufacturers:
    - a. Burke Flooring: [www.burkeflooring.com](http://www.burkeflooring.com).
    - b. Johnsonite, a Tarkett Company: [www.johnsonite.com](http://www.johnsonite.com).
    - c. Roppe Corporation; Rubber Stair Treads: [www.roppe.com/#sle](http://www.roppe.com/#sle).
    - d. Substitutions: See Section 01-6000 - Product Requirements.
  - 2. Minimum Requirements: Comply with FS RR-T-650 requirements corresponding to type specified.
  - 3. Nominal Thickness: 0.1875 inch.

4. Nosing: Square.
  5. Texture: Raised.
  6. Style: See Finish List
  7. Color: To be selected by Architect from manufacturer's full range.
- B. Stair Skirt: Full height in one piece and in maximum available lengths, matching Rubber Base in material and color.
1. Thickness: 0.080 inch.
  2. Pattern: Solid color.
  3. Manufacturers:
    - a. Burke Flooring: [www.burkemercer.com](http://www.burkemercer.com).
    - b. Johnsonite, Inc: [www.johnsonite.com](http://www.johnsonite.com).
    - c. Roppe Corp: [www.roppe.com](http://www.roppe.com).

## **2.04 RESILIENT BASE**

- A. Resilient Base (RBR1): ASTM F1861; top set Style B, Cove.
1. Manufacturers:
    - a. Burke Flooring: [www.burkeflooring.com](http://www.burkeflooring.com).
    - b. Johnsonite, a Tarkett Company: [www.johnsonite.com/#sle](http://www.johnsonite.com/#sle).
    - c. Roppe Corp: [www.roppe.com/#sle](http://www.roppe.com/#sle).
    - d. Substitutions: See Section 01-6000 - Product Requirements.
  2. Height: 4 inch and 6 inch, refer to INTERIOR FINISH SCHEDULE.
  3. Color: see Finish Schedule.

## **2.05 ACCESSORIES**

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
1. Provide only products having lower volatile organic compound (VOC) content than required by the more stringent of the South Coast Air Quality Management District Rule No.1168 and the Bay Area Air Quality Management District Regulation 8, Rule 51.
- C. Moldings, Transition and Edge Strips: Same material as flooring.
- D. Filler for Coved Base: Plastic.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.
1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

### **3.02 PREPARATION**

- A. Remove existing resilient flooring and flooring adhesives; follow the recommendations of RFCI (RWP).
- B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- C. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- D. Prohibit traffic until filler is fully cured.

### **3.03 INSTALLATION**

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Fit joints and butt seams tightly.
- E. Set flooring in place, press with heavy roller to attain full adhesion.
- F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

### **3.04 SHEET FLOORING**

- A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns carefully at seams.
- B. Seams are prohibited in bathrooms, kitchens, toilet rooms, and custodial closets.
- C. Seal seams by heat welding where indicated.
- D. Double cut sheet at seams.
- E. Lay flooring with tightly butted seams, without any seam sealer unless otherwise indicated.
- F. Finish seams in sheet vinyl by heat welding.
- G. Coved Base: Install as detailed on drawings and Room Finish Schedule, using coved base filler as backing at floor to wall junction. Extend sheet flooring vertically to height indicated, and cover top edge with metal cap strip.

### **3.05 RESILIENT TILE FLOORING**

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.



- B. Spread adhesive with notched trowel. Place tile carefully and accurately to avoid repositioning. Roll each section immediately, in both directions with a minimum 100 lb. three-section roller, then re-roll entire floor, in both directions with 1 hour. Hand roll in areas that cannot be reached with a big roller.
- C. Prohibit furniture, fixtures, wash or wax on floor for minimum of 48 hours after installation complete.
- D. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.
- E. Install square tile to directed pattern. Allow minimum 1/2 full size tile width at room or area perimeter.
- F. Install plank tile with a random offset of at least 6 inches from adjacent rows.

### **3.06 RESILIENT BASE**

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.

### **3.07 INSTALLATION - STAIR COVERINGS**

- A. Install stair coverings in one piece for full width and depth of tread.
- B. Install stringers configured tightly to stair profile.
- C. Adhere over entire surface. Fit accurately and securely.

### **3.08 CLEANING**

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

### **3.09 PROTECTION**

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

**END OF SECTION**

BLANK PAGE

**SECTION 09-6813  
TILE CARPETING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Carpet tile, fully adhered.
- B. Textile composite tile flooring.

**1.02 RELATED REQUIREMENTS**

- A. Section 03-3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied flooring.

**1.03 REFERENCE STANDARDS**

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a.
- B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2019.
- C. CRI 104 - Standard for Installation of Commercial Carpet 2015.
- D. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source 2019.

**1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.
- 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 Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Tile Carpeting :
  - 1. Milliken & Company: [www.milliken.com/#sle](http://www.milliken.com/#sle).
  - 2. J & J Flooring - Textile Composite Flooring.
  - 3. Patcraft - Walkoff Matt Tile (Basis of Design).

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

## 2.02 MATERIALS

- A. Tile Carpeting (CPT): Tufted, Textured Loop, manufactured in one color dye lot.
  1. Product: See Finish Schedule in Drawings.
  2. Tile Size: 50 by 50 cm, nominal.
  3. Solution dyed.
  4. Tufted Textured Loop.
  5. Gauge: 1/10
  6. Texture Appearance Retention Rating (TARR): Severe.
  7. Color: see Interior Finish Schedule.
  8. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
  9. Maximum Electrostatic Charge: 3.5 Kv. at 20 percent relative humidity.
  10. Foot Traffic Recommendation TARR: Heavy.
  11. Soil Release Technology: Sentry Soil Protection. "StainSmart".
  12. Backing: Standard backing PVC-Free Underscore ES Cushion.
- B. Walk-Off Tile Carpeting (WOT):
  1. Manufacturer:
    - a. Patcraft (Basis of Design)
    - b. Milliken
    - c. J & J
    - d. Substitutions: See Section 01-6000-Product Requirements.
  2. Manufactured in one color dye lot.
  3. Dye method: Solution Dyed.
  4. Tufted yarn weight: 32 oz.
  5. Model: Beyond The Door.
  6. Color: refer to Interior Finish Schedule.
  7. Size: 24 x 24 inches.
  8. Thickness: 205 inch.
  9. Density: 8,597.
  10. Maximum Electrostatic Charge: 3.5 Kv. at 20 percent relative humidity.
  11. Primary Backing Material: Polyester Felt Cushion.
  12. Foot Traffic Recommendation TARR: Severe.
  13. Adhesive per Manufacturer.
- C. Substitutions: Section 01-6000 - Product Requirements.

## 2.03 ACCESSORIES

- A. Sub-Floor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Adhesives:
  1. Compatible with materials being adhered; maximum VOC content of 50 g/L; CRI (GLP) certified; in lieu of labeled product, independent test report showing compliance is acceptable.
  2. Recommended by carpet tile manufacturer; releasable type.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for flooring installation by testing for moisture and pH.
  - 1. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.
- C. Verify that required floor-mounted utilities are in correct location.

### **3.02 PREPARATION**

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- D. Vacuum clean substrate.

### **3.03 INSTALLATION**

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions.
- C. Blend carpet from different cartons to ensure minimal variation in color match.
- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Installation Method: per Architect
- F. Layout pattern / change of style / color To Be Determined supplied by Architect.
- G. Fully adhere carpet tile to substrate.
- H. Complete installation of edge strips, concealing exposed edges.

### **3.04 CLEANING**

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

**END OF SECTION**

BLANK PAGE

**SECTION 09-9000  
PAINTING AND COATING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints, stains, varnishes, and other coatings.
- C. Field application of elastomeric coating.
- D. Anti-graffiti coatings as noted on exterior surfaces - concrete columns.
- E. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
  - 1. Mechanical and Electrical:
    - a. In finished areas, paint all conduit, unless otherwise indicated.
    - b. In finished areas, paint shop-primed items.
    - c. On the roof and outdoors, paint all equipment that is exposed to weather or to view, including that which is factory-finished.
- F. Do Not Paint or Finish the Following Items:
  - 1. Items fully factory-finished unless specifically so 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 so indicated.
  - 6. Glass.
  - 7. Acoustical materials, unless specifically so indicated.
  - 8. Concealed pipes, ducts, and conduits.

**1.02 DEFINITIONS**

- A. Conform to ASTM D16 for interpretation of terms used in this section.

**1.03 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2016.
- C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials 2016.

**1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

- B. Product Data: Provide data on all finishing products, including VOC content.
- C. Samples: Submit two paper chip samples, 8x8 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.

#### **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 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.

#### **1.06 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. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
  - 1. Benjamin Moore & Co: [www.benjaminmoore.com/#sle](http://www.benjaminmoore.com/#sle).
  - 2. PPG Paints: [www.ppgpaints.com/#sle](http://www.ppgpaints.com/#sle).
  - 3. Sherwin-Williams.
  - 4. Rodda.
  - 5. Pittsburgh.
- C. Transparent Finishes:
  - 1. Same as above.
- D. Stains:
  - 1. Same as above.
- E. Primer Sealers: Same manufacturer as top coats.
  - 1. Same as above.
- F. Substitutions: See Section 01-6000 - Product Requirements.

#### **2.02 PAINTS AND COATINGS - GENERAL**

- A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.



1. Provide paints and coatings 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.
  2. Supply each coating material in quantity required to complete entire project's work from a single production run.
  3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
  4. Paint coating required on all sides of exposed surfaces and trim
- B. Primers: As follows unless other primer is required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- C. Volatile Organic Compound (VOC) Content:
1. Provide coatings that comply with the most stringent requirements specified in the following:
    - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
  2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- D. Colors: As indicated on drawings.
1. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

### **2.03 PAINT SYSTEMS - EXTERIOR**

- A. Primer(s): As recommended by manufacturer of top coats.
- B. Paint WE-OP-3L - Wood, Opaque, Latex, 3 Coat - unfinished wood trim, soffits:
1. One coat of latex primer sealer.
  2. Semi-gloss: Two coats of latex enamel; Moorcraft Super Spec Latex House & Trim No. 170, applied at dry film thickness of not less than 1.1 mils per coat.
- C. Paint WE-OP-2L - Wood, Opaque, Latex, 2 Coat - Preprimed Siding & Trim:
1. One coat of latex primer sealer - touch up as needed on bare surfaces, end cuts, etc.
  2. Semi-gloss: Two coat of latex enamel; Moorcraft Super Spec Latex House & Trim No. 170, applied at dry film thickness of not less than 1.1 mils per coat.
- D. Paint WE-TR-VS - Wood, Semi-Transparent Stain:
1. Two coats of stain; Moorwood Alkyd Semi-Transparent Deck & Siding Stain.
- E. Anti-Graffiti Coating -Concrete/Masonry, 2 Coat:
1. Two coats of alkyd enamel; Benjamin Moore 1K Siloxane.
  2. Location: Concrete canopy columns.
  3. 12 wet mils thickness, 9.0 dry mils thickness.
- F. Paint CE-OP-3L - Masonry/Concrete, Portland Cement Plaster, Opaque, Latex, 3 Coat:
1. One coat of block filler.
  2. Flat: Two coats of elastomeric coating; Benjamin Moore; Morelastic Elastomeric Waterproof Coating (056). Applied at a dry film thickness of not less than 7.5 mils per coat. 15 mils total dry film thickness.
  3. Location: Lower floor of west addition, on exposed/above grade concrete walls only.
- G. Paint ME-OP-3A - Ferrous Metals, Unprimed, Alkyd, 3 Coat:
1. One coat of alkyd primer.

2. Semi-gloss: Two coats of alkyd enamel; Benjamin Moore Paints: IMC DTM Acrylic Semi-Gloss (M29). Applied at a dry film thickness of not less than 2.0 mils per coat.

H. Paint ME-OP-2A - Ferrous Metals, Primed, Alkyd, 2 Coat:

1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
2. Semi-gloss: Two coats of alkyd enamel; Benjamin Moore Paints: IMC DTM Acrylic Semi-Gloss (M29). Applied at a dry film thickness of not less than 2.0 mils per coat.

## **2.04 PAINT SYSTEMS - INTERIOR**

A. Paint WI-OP-3L - Wood, Opaque, Latex, 3 Coat:

1. One coat of latex primer sealer.
2. Semi-gloss: Two coats of latex enamel; Benjamin Moore Paints; Moorcraft Super Spec Latex Semi-Gloss Enamel No. 276: Applied at a dry film thickness of not less than 1.2 mils per coat..

B. Paint WI-TR-VS - Wood, Transparent, Varnish, Stain:

1. One coat of stain; Benjamin Moore Paints; Benwood Wood Finishes Penetrating Stain (234).
2. One coat sealer.
3. Gloss: Two coats of varnish; Benjamin Moore; Stays Clear Acrylic Polyurethane No. 423, Satin.

C. Paint MI-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:

1. One coat of latex primer.

D. Paint MI-OP-2L - Ferrous Metals, Primed, Latex, 2 Coat:

1. Touch-up with latex primer.
2. Gloss: Two coats of latex enamel; Benjamin Moore Paints: IMC DTM Acrylic Semi-Gloss (M29). Applied at a dry film thickness of not less than 2.0 mils per coat.

E. Paint GI-OP-3L - Gypsum Board/Plaster, Latex, 3 Coat:

1. One coat of Moorcraft Super Spec Latex Enamel Undercoater & Primer Sealer No. 253: Applied at a dry film thickness of not less than 1.2 mils, primer sealer.
2. Eggshell: Two coats of latex enamel; Moorcraft Super Spec Latex Eggshell Enamel No. 274: Applied at a dry film thickness of not less than 1.3 mils per coat.

## **2.05 ACCESSORY MATERIALS**

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

- C. Test shop-applied primer for compatibility with subsequent cover materials.
- 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. Gypsum Wallboard: 12 percent.
  2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
  3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
  4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to coating 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. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- F. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- G. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-SP 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).
- H. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.
- I. Shop-Primed Steel Surfaces to be Finish Painted: 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.
- J. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- K. Interior 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.
- L. Exterior Wood to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior calking compound after sealer has been applied. Prime concealed surfaces.
- M. Glue-Laminated Beams: Prior to finishing, wash surfaces with solvent, remove grease and dirt.
- N. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

### **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 instructions.
- 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.
- E. Sand wood and metal surfaces lightly between coats to achieve required finish.
- F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- G. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

**END OF SECTION**

**SECTION 10-1400  
SIGNAGE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Room and door signs.
- B. Building identification signs.
- C. Cast metal plaque.

**1.02 REFERENCE STANDARDS**

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

**1.03 FIELD CONDITIONS**

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Signs:
  - 1. Best Sign Systems, Inc: [www.bestsigns.com/#sle](http://www.bestsigns.com/#sle).
  - 2. Inpro: [www.inprocorp.com/#sle](http://www.inprocorp.com/#sle).
  - 3. Mohawk Sign Systems, Inc: [www.mohawksign.com/#sle](http://www.mohawksign.com/#sle).
  - 4. Gemini Signage.
  - 5. Substitutions: See Section 01-6000 - Product Requirements.

**2.02 SIGNAGE APPLICATIONS**

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
- B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
  - 1. Sign Type: Flat signs with engraved panel media as specified.
  - 2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
  - 3. Character Height: 1 inch.
  - 4. Sign Height: 2 inches, unless otherwise indicated.

5. Classroom and Office Doors: Identify with name below.
    - a. DIRECTOR (1) with braille; in addition, provide "window" section for replaceable occupant name.
    - b. WORKROOM (1) with braille.
    - c. TEEN ROOM (1) with braille.
  6. Service Rooms: Identify with names and quantities:
    - a. CUSTODIAL (2) with braille.
    - b. UTILITIES / FIRE RISER (1) with braille.
    - c. STAFF ONLY (2) with braille.
  7. Rest Rooms: Identify with pictograms, the names as noted below, and braille.
    - a. Sign and quantity:
      - 1) RESTROOM (2) with graphic and braille.
      - 2) FAMILY (2) with graphic and braille.
      - 3) STAFF TOILET (1) with graphic and braille.
- C. Building Identification Signs - street address:
1. Use individual metal letters, 6 inch high, cast metal letters.
  2. Mount on outside wall in location indicated on drawings.
  3. Signage: 259

### **2.03 SIGN TYPES**

- A. Flat Signs: Signage media without frame.
  1. Edges: Square.
  2. Corners: Square.
  3. Wall Mounting of One-Sided Signs: Tape adhesive.
- B. Color and Font: Unless otherwise indicated:
  1. Character Font: Helvetica, Arial, or other sans serif font.
  2. Character Case: Upper case only.
  3. Background Color: Clear.
  4. Character Color: Contrasting color.

### **2.04 TACTILE SIGNAGE MEDIA**

- A. Engraved Panels: Laminated colored plastic; engraved through face to expose core as background color:
  1. Total Thickness: 1/16 inch.

### **2.05 PLAQUES**

- A. Metal Plaques:
  1. Metal: Bronze casting.
  2. Metal Thickness: 1/8 inch, minimum.
  3. Size: 24 inches by 24 inches.
  4. Text and Typeface:
    - a. Character Font: Helvetica, Arial, or other sans serif font.
    - b. Character Case: Upper case only.
    - c. Character Color: Contrast with background color.
    - d. Provide allowance for 500 letters.
  5. Border Style: Single line.
  6. Background Texture: Ripple.
  7. Surface Finish: Brushed, satin.
  8. Protective Coating: Manufacturer's standard clear coating.

9. Mounting: Blind studs.
10. Quantity: One (1).

## **2.06 DIMENSIONAL LETTERS**

- A. Cast Metal Letters:
  1. Metal: Aluminum casting.
  2. Metal Thickness: 1/8 inch minimum.
  3. Text and Typeface:
    - a. Character Font: Helvetica, Arial, or other sans serif font.
    - b. Character Case: Upper case only.
  4. Finish: As selected by Architect from manufacturer's full range.
  5. Mounting: Concealed screws.

## **2.07 ACCESSORIES**

- A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.
- B. Exposed Screws: Stainless steel.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.
- B. Confirm electrical and data rough-in is complete and acceptable prior to commencing work at reader board sign.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.
- D. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

**END OF SECTION**

BLANK PAGE



**SECTION 10-1419  
DIMENSIONAL LETTER SIGNAGE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Dimensional letter signage.
- B. Illumination system.

**1.02 REFERENCE STANDARDS**

- A. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. UL 879 - Electric Sign Components Current Edition, Including All Revisions.

**1.03 SUBMITTALS**

- A. See Section 01-3000 - 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, elevations, materials, text and graphic layout, and attachment details.
  - 2. Show locations of electrical service connections.
  - 3. Include diagrams for power, signal, and control wiring.
- D. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

**2.02 DIMENSIONAL LETTERS**

- A. Applications: Building identification.
  - 1. Use individual metal letters, with connecting bar to minimize building mounting attachment and power connection.
  - 2. Mounting Location: Exterior as indicated on drawings.
- B. Metal Letters:
  - 1. Material: Aluminum casting.
  - 2. Thickness: 1/8 inch minimum.
  - 3. Letter Height: 12 inches.
  - 4. Text and Typeface:
    - a. Character Font: Helvetica, Arial, or other sans serif font.
    - b. Character Case: Upper case only.
  - 5. Finish: Brushed, satin.

6. Color: As selected.
7. Mounting: Concealed screws.
8. Illumination System: Halo-lit reverse channel letters.
  - a. Provide products that are listed and labeled as complying with UL 879, where applicable.
  - b. Power: 120 V, 60 Hz, 1 phase, 15 A.

### **2.03 ACCESSORIES**

- A. Concealed Screws: Noncorroding metal; stainless steel, galvanized steel, chrome plated, or other.
- B. Electrical Components and Devices: Listed and labeled as defined in NFPA 70 by a qualified testing agency.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that electrical service is correctly sized and located to accommodate dimensional letter signs.
- C. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install with horizontal edges level.

**END OF SECTION**

**SECTION 10-2600  
WALL AND DOOR PROTECTION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Corner guards.
- B. Protective wall covering.

**1.02 REFERENCE STANDARDS**

- A. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics 2010 (Reapproved 2018).
- B. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents 2020.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2015a.
- D. ASTM F476 - Standard Test Methods for Security of Swinging Door Assemblies 2014.

**1.03 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate physical dimensions, features, wall mounting brackets with mounted measurements, anchorage details, and rough-in measurements.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver wall and door protection items in original, undamaged protective packaging. Label items to designate installation locations.
- B. Protect work from moisture damage.
- C. Protect work from UV light damage.
- D. Do not deliver products to project site until areas for storage and installation are fully enclosed, and interior temperature and humidity are in compliance with manufacturer's recommendations for each type of item.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Corner Guards:
  - 1. The Cornerguard Store, <https://www.thecornerguardstore.com>
  - 2. Inpro: [www.inprocorp.com/#sle](http://www.inprocorp.com/#sle).
  - 3. Substitutions: See Section 01-6000 - Product Requirements.

- B. Protective Wall Covering:
  - 1. Construction Specialties, Inc; Acrovyn High-Impact Wall Covering: [www.c-sgroup.com/#sle](http://www.c-sgroup.com/#sle).
  - 2. Inpro: [www.inprocorp.com/#sle](http://www.inprocorp.com/#sle).
  - 3. Substitutions: See Section 01-6000 - Product Requirements.

## **2.02 PERFORMANCE CRITERIA**

- A. Impact Strength: Unless otherwise noted, provide protection products and assemblies that have been successfully tested for compliance with applicable provisions of ASTM D256 and/or ASTM F476.
- B. Chemical and Stain Resistance: Unless otherwise noted, provide protection products and assemblies with chemical and stain resistance complying with applicable provisions of ASTM D543.

## **2.03 PRODUCT TYPES**

- A. Corner Guards - Surface Mounted:
  - 1. Material: Anodized Aluminum (Type 5005), Satin Finish, .060 Gauge min.
  - 2. Width of Wings: 2 inches.
  - 3. Corner: Square.
  - 4. Color: As selected from manufacturer's standard colors.
  - 5. Length: See Elevations One piece.
  - 6. Preformed end caps.
  - 7. Style SSM-20N Series Acrovyn 4000 - Basis of Design.
- B. Protective Wall Covering:
  - 1. Material: Polyethylene terephthalate (PET or PETG); PVC and PBTs-free.
  - 2. Thickness: 0.060 inch.
  - 3. Color: As selected from manufacturer's standard colors.
  - 4. Texture: Suede.
    - a. Texture Direction: Horizontal.
  - 5. Accessories: Provide manufacturer's standard color-matched trim and moldings.
  - 6. Mounting: Adhesive.

## **2.04 FABRICATION**

- A. Fabricate components with tight joints, corners and seams.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.
- B. Verify that substrate surfaces for adhered items are clean and smooth.
- C. Start of installation constitutes acceptance of project conditions.

### **3.02 INSTALLATION**

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to supporting construction.
- B. Position corner guard 4 inches above finished floor to 48 inches high.
- C. Position protective wall covering no less than 1 inch above finished floor to allow for floor level variation.
  - 1. Full-Height Installation: Establish a plumb line located at edge of starting point of first sheet to ensure following sheets will be installed plumb.
  - 2. Wainscot Installation: Establish a level line at the specified height for entire length of run. Install by aligning top of edge of covering with this line.
  - 3. Apply adhesive with 1/8 inch V-notch trowel to an area of wall surface that can be completed within cure time of the adhesive.
  - 4. Install trim pieces as required for a complete installation. Allow tolerance for thermal movement.
  - 5. Use a roller to ensure maximum contact with adhesive.

**3.03 TOLERANCES**

- A. Maximum Variation From Required Height: 1/4 inch.
- B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch.

**3.04 CLEANING**

- A. Clean wall and door protection items of excess adhesive, dust, dirt, and other contaminants.

**END OF SECTION**

BLANK PAGE

**SECTION 10-2800  
TOILET, BATH, AND LAUNDRY ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Commercial toilet accessories.
- B. Accessories for toilet rooms and utility rooms.
- C. Diaper changing stations.
- D. Utility room accessories.
- E. Grab bars.

**1.02 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures 2011 (Reaffirmed 2017).
- C. ASTM C1036 - Standard Specification for Flat Glass 2011.
- D. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror 2018.
- E. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use 2004, with Editorial Revision (2016).

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

**1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Commercial Toilet, Shower, and Bath Accessories:
  - 1. AJW Architectural Products: [www.ajw.com/#sle](http://www.ajw.com/#sle).
  - 2. American Specialties, Inc: [www.americanspecialties.com/#sle](http://www.americanspecialties.com/#sle).

3. Bradley Corporation: [www.bradleycorp.com/#sle](http://www.bradleycorp.com/#sle).
4. Bobrick.
5. Substitutions: Section 01-6000 - Product Requirements.

## 2.02 FINISHES

- A. Stainless Steel: Satin finish, unless otherwise noted.

## 2.03 COMMERCIAL TOILET ACCESSORIES

- A. Toilet Paper Dispenser: Double roll, surface mounted, for coreless type rolls.
- B. Paper Towel Dispenser: Electric, roll paper type.
1. Mounting: Surface mounted.
  2. Power: Battery operated.
  3. Refill Indicator: Illuminated refill indicator.
- C. Mirrors: Stainless steel framed, 1/4 inch thick annealed float glass; ASTM C1036.
1. Annealed Float Glass: Silvering, protective and physical characteristics in compliance with ASTM C1503.
  2. Size: As scheduled.
  3. Frame: 0.05 inch angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
  4. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.
  5. Products:
    - a. Bobrick B-165.
    - b. Substitutions: Section 01-6000 - Product Requirements.
- D. Grab Bars: Stainless steel, smooth surface.
1. Standard Duty Grab Bars:
    - a. Push/Pull Point Load: 250 pound-force, minimum.
    - b. Dimensions: 1-1/4 inch outside diameter, minimum 0.05 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
    - c. Length: 42, 36, and 18 inches.
- E. Diaper Changing Station: Wall-mounted folding diaper changing station for use in commercial toilet facilities, meeting or exceeding {rs#1}.
1. Material: Polyethylene.
  2. Color: White.
  3. Minimum Rated Load: 250 lbs.
  4. Manufacturers:
    - a. American Specialties, Inc : [www.americanspecialties.com](http://www.americanspecialties.com).
    - b. Bradley Corporation : [www.bradleycorp.com](http://www.bradleycorp.com).
    - c. Diaper Deck & Company : [www.diaperdeck.com](http://www.diaperdeck.com).
    - d. Koala Kare Products : [www.koalabear.com](http://www.koalabear.com).
    - e. Substitutions: See Section 01600 - Product Requirements.
- F. Mirrors: Stainless steel framed, 6mm thick float glass mirror.
1. Sizes: 24" x 36". See elevations for locations.

## 2.04 UTILITY/LAUNDRY ROOM ACCESSORIES

- A. Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, hat-shaped channel.



1. Holders: Three spring-loaded rubber cam holders.
2. Length: 24 inches.
3. Products:
  - a. Bobrick B-223.
  - b. Substitutions: 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 06-1000 for installation of blocking in walls.

#### **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: As indicated on drawings.
- D. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings

#### **3.04 SCHEDULE**

- A. Custodial Rooms, each to have:
  1. (1) Mop and broom holder
- B. SINGLE USER TOILET ROOMS, each room to have:
  1. (1) 36 inch grab bar
  2. (1) 42 inch grab bar
  3. (1) 18 inch grab bar
  4. (1) Toilet Tissue Dispenser - Owner Furnished, Installed by Contractor (OFCl)
  5. (1) soap dispenser - Owner Furnished, Installed by Contractor (OFCl)
  6. (1) Paper Towel Dispenser - OFCl
  7. (1) Mirror - 24w x 36h
  8. (1) Diaper Changing Station, select rooms as noted in Drawings.

**END OF SECTION**

BLANK PAGE

**SECTION 10-4400  
FIRE PROTECTION SPECIALTIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fire extinguisher cabinets.
- B. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06-1000 - Rough Carpentry: Wood blocking product and execution requirements.

**1.03 REFERENCE STANDARDS**

- A. NFPA 10 - Standard for Portable Fire Extinguishers 2017, with Errata (2018).
- B. UL (DIR) - Online Certifications Directory Current Edition.

**1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.
- C. Product Data: Provide extinguisher operational features.

**1.05 FIELD CONDITIONS**

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Fire Extinguisher Cabinets and Accessories:
  - 1. JL Industries, Inc: [www.jlindustries.com](http://www.jlindustries.com).
  - 2. Larsen's Manufacturing Co: [www.larsensmfg.com/#sle](http://www.larsensmfg.com/#sle).
  - 3. Potter-Roemer: [www.potterroemer.com/#sle](http://www.potterroemer.com/#sle).
  - 4. Substitutions: See Section 01-6000 - Product Requirements.

**2.02 FIRE EXTINGUISHER CABINETS**

- A. Metal: Formed primed steel sheet; 0.036 inch thick base metal.
- B. Cabinet Configuration: Semi-recessed type.
  - 1. Sized to accommodate accessories and extinguisher.
  - 2. Trim: Returned to wall surface, with 3 inch projection, rolled edge.

- C. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180 degree opening with two butt hinge.
- D. Door Glazing: Float glass, clear, 1/8 inch thick, and set in resilient channel glazing gasket.
- E. Weld, fill, and grind components smooth.
- F. Finish of Cabinet Exterior Trim and Door: No. 4 - Brushed stainless steel.
- G. Finish of Cabinet Interior: White colored enamel.

### **2.03 ACCESSORIES**

- A. Graphic Identification: Fire Extinguisher.

## **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. Install cabinets plumb and level in wall openings, 32 inches from finished floor to inside bottom of cabinet.
- C. Position cabinet signage at 8 feet above finished floor.

### **3.03 LOCATIONS**

- A. See Drawings, Floor Plan for locations.
- B. Verify locations of all cabinets with Fire Marshal prior to installation.

**END OF SECTION**

**SECTION 14-2400  
HYDRAULIC ELEVATORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Complete hydraulic elevator systems - Machine Room-Less type, with Control Space closet for electrical panel.
  - 1. Passenger type.
- B. Elevator Maintenance Contract.

**1.02 RELATED REQUIREMENTS**

- A. Section 03-3000 - Cast-in-Place Concrete: Includes enclosed hoistway, elevator pit, divider beams, overhead hoist beams, grouting thresholds, and grouting hoistway entrance frames.
- B. Section 09-6500 - Resilient Flooring: Floor finish in car.
- C. Section 09-6816 - Sheet Carpeting: Floor finish in car.
- D. Section 21-1300 - Fire-Suppression Sprinkler Systems: Sprinkler heads in hoistway.
- E. Section 22-0500 - Plumbing Materials and Methods: Motor for sump pump in pit.
- F. Section 22-3000 - Plumbing Equipment: Pit drain.
- G. Section 26-0510 - Raceways, Boxes & Conductors
- H. Section 28-3100 - Fire Alarm and Detection - Addressable:
  - 1. Fire and smoke detectors and interconnecting devices.

**1.03 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials current edition.
- B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2012.
- C. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- D. AISC 360 - Specification for Structural Steel Buildings 2016.
- E. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test 2010.
- F. ASME A17.1 - Safety Code for elevators and escalators 2016.
- G. ASME A17.2 - Guide for Inspection of Elevators, Escalators, and Moving Walks 2017.
- H. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.
- I. ASTM A139/A139M - Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over) 2016.
- J. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes 2017.

- K. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2015.
- L. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- M. 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 2016.
- N. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021.
- O. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.
- P. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric] 2013.
- Q. ASTM B455/B455M - Standard Specification for Copper-Zinc-Lead Alloy (Leaded-Brass) Extruded Shapes 2020.
- R. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2012.
- S. AWS D1.1/D1.1M - Structural Welding Code - Steel 2015.
- T. NEMA LD 3 - High-Pressure Decorative Laminates 2005.
- U. NEMA MG 1 - Motors and Generators 2018.
- V. NFPA 13 - Standard for the Installation of Sprinkler Systems Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- W. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- X. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2019.
- Y. PS 1 - Structural Plywood 2009.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate work with other installers to provide conduits necessary for installation of wiring including but not limited to:
    - a. Elevator equipment devices remote from elevator machine room or hoistway.
    - b. Elevator pit for lighting and sump pump.
  - 2. Coordinate work with other installers for equipment provisions necessary for proper elevator operation, including but not limited to, the following:
    - a. Shunt trip devices for automatic disconnection of elevator power prior to fire suppression system activation.
    - b. Overcurrent protection devices selected to achieve required selective coordination.
- B. Preinstallation Meeting: Convene meeting at least one week prior to start of this work.
  - 1. Review schedule of installation, proper procedures and conditions, and coordination with related work.

- C. Construction Use of Elevator: Not permitted.

### **1.05 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit data on following items:
  - 1. Signal and operating fixtures, operating panels, and indicators.
  - 2. Car design, dimensions, layout, and components.
  - 3. Car and hoistway door and frame details.
  - 4. Electrical characteristics and connection requirements.
- C. Shop Drawings: Include appropriate plans, elevations, sections, diagrams, and details on following items:
  - 1. Elevator Equipment and Machines: Size and location of driving machines, power units, controllers, governors, and other components.
  - 2. Hoistway Components: Size and location of car guide rails, buffers, jack unit and other components.
  - 3. Rail bracket spacing; maximum loads imposed on guide rails requiring load transfer to building structural framing.
  - 4. Clearances and over-travel of car.
  - 5. Locations in hoistway and machine room of traveling cables and connections for car lighting and telephone.
  - 6. Location and sizes of hoistway and car doors and frames.
  - 7. Electrical characteristics and connection requirements.
  - 8. Indicate arrangement of elevator equipment and allow for clear passage of equipment through access openings.
- D. Testing Agency's Qualification Statement.
- E. Initial Maintenance Contract.
- F. Maintenance Contract: Submit proposal to Owner for standard one year continuing maintenance contract agreement in accordance with ASME A17.1 and requirements as indicated, starting on date initial maintenance contract is scheduled to expire.
  - 1. Indicate in proposal the services, obligations, conditions, and terms for agreement period and for renewal options.

### **1.06 QUALITY ASSURANCE**

- A. Designer Qualifications: Design guide rails, brackets, anchors, and machine anchors under direct supervision of a licensed Professional Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.
- C. Installer Qualifications: Trained personnel and supervisor on staff of elevator equipment manufacturer.
- D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of type specified in this section.

### **1.07 WARRANTY**

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

- B. Provide manufacturer's warranty for elevator operating equipment and devices for one year from Date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Hydraulic Elevator Manufacturers:
  - 1. Canton Architectural Products, Inc.
    - a. Basis of Design - Model Revolution MRL Holeless, center opening doorway.
    - b. Passenger Cab Basis of Design - Model CE 150.
  - 2. Otis Elevator Company: [www.otis.com/#sle](http://www.otis.com/#sle).
  - 3. Schindler Elevator Corporation: [www.schindler.com/#sle](http://www.schindler.com/#sle).
  - 4. ThyssenKrupp Elevator: [www.thyssenkruppelevator.com/#sle](http://www.thyssenkruppelevator.com/#sle).
- B. Substitutions: See Section 01-6000 - Product Requirements.

### **2.02 HYDRAULIC ELEVATORS**

- A. Hydraulic Passenger Elevator:
  - 1. Hydraulic Elevator Equipment:
    - a. Holeless hydraulic with cylinder mounted within hoistway.
  - 2. Drive System:
    - a. Variable voltage variable frequency (VVVF) to modulate motor speed.
  - 3. Operation Control Type:
    - a. Selective Collective Automatic Operation Control.
  - 4. Service Control Type:
    - a. Standard service control only.
  - 5. Interior Car Height: 96 inch.
  - 6. Electrical Power: 480 volts; alternating current (AC); three phase; 60 Hz.
  - 7. Rated Net Capacity: 2500 pounds.
  - 8. Rated Speed: 100 feet per minute.
  - 9. Hoistway Size: As indicated on drawings.
  - 10. Interior Car Platform Size: 6 foot x 4 inch wide by 7 foot x 0 inch deep.
  - 11. Elevator Pit Depth: 48 inch.
  - 12. Overhead Clearance at Top Floor: 144 inch.
  - 13. Travel Distance: As indicated on drawings.
  - 14. Number of Stops: As indicated on drawings.
  - 15. Number of Openings: 2 Front.
  - 16. Hydraulic Equipment Location: As indicated on drawings

### **2.03 COMPONENTS**

- A. Elevator Equipment:
  - 1. Motors, Hydraulic Equipment, Controllers, Controls, Buttons, Wiring, Devices, and Indicators: Comply with NFPA 70; see Section 26-0583.
  - 2. Guide Rails, Cables, Buffers, Attachment Brackets and Anchors: Design criteria for components includes safety factors in accordance with applicable requirements of Elevator Code, ASME A17.1.
  - 3. Buffers:
    - a. Spring type for elevators with speed less than or equal to 200 fpm.
  - 4. Lubrication Equipment:
    - a. Provide grease fittings for periodic lubrication of bearings.



- b. Grease Cups: Automatic feed type.
  - c. Lubrication Points: Visible and easily accessible.
- B. Electrical Equipment:
- 1. Motors: NEMA MG 1.
  - 2. Boxes, Conduit, Wiring, and Devices: As required by NFPA 70; see Sections 26-0510.
  - 3. Sump Pump in Pit: See Drawings.
  - 4. Spare Conductors: Provide ten percent in extra conductors and two pairs of shielded audio cables in traveling cables.
  - 5. Include wiring and connections to elevator devices remote from hoistway and between elevator machine room. Provide additional components and wiring to suit machine room layout. See Section 26-0510.

## **2.04 PERFORMANCE REQUIREMENTS**

- A. Regulatory Requirements: Comply with ASME A17.1, applicable local codes, and authorities having jurisdiction (AHJ).
- B. Accessibility Requirements: Comply with ADA Standards.
- C. Perform structural steel design, fabrication, and installation in accordance with AISC 360.
- D. Perform welding of steel in accordance with AWS D1.1/D1.1M.
- E. Fabricate and install door and frame assemblies in accordance with NFPA 80 and in compliance with requirements of authorities having jurisdiction.
- F. Perform electrical work in accordance with NFPA 70.
- G. Comply with venting or pressurization of hoistway design in accordance with HVAC system requirements and authorities having jurisdiction (AHJ).
- H. Comply with fire protection sprinkler system of hoistway design in accordance with NFPA 13 requirements and authorities having jurisdiction (AHJ). See Section 21-1300.

## **2.05 OPERATION CONTROLS**

- A. Elevator Controls: Provide landing operating panels and landing indicator panels.
  - 1. Landing Operating Panels: Metallic type, one for originating "Up" and one for originating "Down" calls, one button only at terminating landings; with illuminating indicators.
  - 2. Landing Indicator Panels: Illuminating.
  - 3. Comply with ADA Standards for elevator controls.
- B. Interconnect elevator control system with building security, fire alarm, and smoke alarm systems.
- C. Door Operation Controls:
  - 1. Program door control to open doors automatically when car arrives at floor landing.
  - 2. Render "Door Close" button inoperative when car is standing at dispatch landing with doors open.
  - 3. Door Safety Devices: Moveable, retractable safety edges, quiet in operation; equipped with photo-electric light rays.

## **2.06 OPERATION CONTROL TYPE**

- A. Single Automatic (Push Button) Operation Control: Applies to car in single elevator shaft.
  - 1. Refer to description provided in ASME A17.1.

2. Set system operation so that momentary pressure of landing button dispatches car from other landing to that landing.
  3. Allow call registered by momentary pressure of landing button at any time to remain registered until car stops in response to that landing call.
  4. If elevator car door is not opened within predetermined period of time after car has stopped at terminal landing allow car to respond to call registered from other landing.
- B. Selective Collective Automatic Operation Control: Applies to car in single elevator shaft.
1. Refer to description provided in ASME A17.1.
  2. Automatic operation by means of one button in the car for each landing served and by "UP" and "DOWN" buttons at the landings.
  3. Stops are registered by momentary actuation of landing car buttons without consideration of the number of buttons actuated or the sequence buttons are actuated, but the stops are made in the order that landings are reached in each direction of travel.
  4. All "UP" landing calls are made when car is traveling in the up direction.
  5. All "DOWN" landing calls are made when car is traveling in the down direction.
  6. Uppermost and lowermost calls are answered as soon as they are reached without consideration of the car travel direction.

## **2.07 MATERIALS**

- A. Steel Cylinder Casing: ASTM A139/A139M, Grade A steel.
- B. Rolled Steel Sections, Shapes, Rods: ASTM A36/A36M.
- C. Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel), with matte finish.
- D. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- E. Stainless Steel Sheet: ASTM A666, Type 304; No. 4 Brushed finish unless otherwise indicated.
- F. Stainless Steel Bars, Shapes and Moldings: ASTM A276/A276M, Type 304.
- G. Extruded Brass Shapes: ASTM B455/B455M, Copper Alloy UNS C38500, Architectural Bronze, 57 percent copper, polished finish.
- H. Extruded Aluminum: ASTM B221 (ASTM B221M), natural anodized finish unless otherwise indicated.
- I. Aluminum Sheet: ASTM B209/B209M, 3105 alloy, O temper.
- J. Plywood: PS 1, Structural I, Grade C-D or better, sanded.
- K. Tempered Glass: 3/8 inch minimum thickness, fully tempered in compliance with ASME A17.1, 16 CFR 1201, ANSI Z97.1, and ASTM C1048 tempered glass requirements.
- L. Carpet Flooring: See Section 09-6816.
- M. Plastic Laminate: NEMA LD 3, Type HGS, color as selected by Architect from manufacturer's standard line of colors.

## **2.08 CAR AND HOISTWAY ENTRANCES**

- A. Elevator, No. 1:
  1. Car and Hoistway Entrances, Each Elevator Floor Lobby:
    - a. Framed Opening Finish and Material: Brushed stainless steel.
    - b. Car Door Material: Stainless steel, with rigid sandwich panel construction.
    - c. Hoistway Door Material: Stainless steel, with rigid sandwich panel construction.

- d. Door Type: Double leaf.
- e. Door Width: 42 inches.
- f. Door Height: 84 inches.
- g. Sills: Extruded aluminum.

## **2.09 CAR EQUIPMENT AND MATERIALS**

- A. Elevator Car, No. 1:
  - 1. Car Operating Panel: Provide main and auxiliary; flush-mounted applied face plate, with illuminated call buttons corresponding to floors served with "Door Open/Door Close" buttons, "Door Open" button, "Door Close" button, and alarm button.
    - a. Panel Material: Integral with front return; one per car.
    - b. Car Floor Position Indicator: Above door with illuminating position indicators.
    - c. Locate alarm button where it is unlikely to be accidentally actuated; not more than 54 inch above car finished floor.
  - 2. Flooring: Carpeting.
  - 3. Front Return Panel: Match material of car door.
  - 4. Door Wall: Plastic laminate on plywood.
  - 5. Hand Rail: Stainless steel, at all three sides. Provide open clearance space 1-1/2 inch (38 mm) wide to face of wall.
    - a. Flat Bar Stock, Solid: 1/4 inch thick by 2 inch high.
    - b. Stainless Steel Finish: No. 4 Brushed.
  - 6. Ceiling:
    - a. Lay-in Panel: Aluminum sheet.
    - b. Lighting: Compact fluorescent downlights.
- B. Car Accessories:
  - 1. Certificate Frame: Stainless steel frame glazed with tempered glass, and attached with tamper-proof screws.

## **2.10 ELEVATOR ELECTRICAL CONTROL CLOSET FITTINGS**

- A. Wall-Mounted Frames: Glazed with clear plastic; sized as required. Provide one chart each for master electric and hydraulic schematic and for lubrication chart. Install charts.
- B. Electrical equipment and disconnect as required by elevator manufacture and elevator code.

## **2.11 FINISHES**

- A. Clear Anodized Finish: Class I, AAMA 611 AA-M12C22A41, clear anodic coating with electrolytically deposited organic seal; not less than 0.7 mil, 0.0007 inch thick.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting this work.
- B. Verify that hoistway, pit, and electrical room/disconnect room or closet are ready for work of this section.
- C. Verify hoistway shaft and openings are of correct size and within tolerance.
- D. Verify location and size of machine foundation and position of machine foundation bolts.

- E. Verify that electrical power is available and of correct characteristics.

### **3.02 PREPARATION**

- A. Arrange for temporary electrical power for installation work and testing of elevator components; see Section 01-5000 - Temporary Facilities and Controls for additional requirements.
- B. Maintain elevator pit excavation free of water.

### **3.03 INSTALLATION**

- A. Coordinate this work with installation of hoistway wall construction.
- B. Install system components, and connect equipment to building utilities.
- C. Provide conduit, electrical boxes, wiring, and accessories; see Sections 26-0510.
- D. Install hydraulic piping between cylinder and pump unit.
- E. Mount machines, motors, and pumps on vibration and acoustic isolators.
  - 1. Place on structural supports and bearing plates.
  - 2. Securely fasten to building supports.
  - 3. Prevent lateral displacement.
- F. Install hoistway, elevator equipment, and components in accordance with approved shop drawings.
- G. Install guide rails to allow for thermal expansion and contraction movement of guide rails.
- H. Accurately machine and align guide rails, forming smooth joints with machined splice plates.
- I. Install hoistway door sills, frames, and headers in hoistway walls; grout sills in place, set hoistway floor entrances in alignment with car openings, and align plumb with hoistway.
- J. Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime two coats.
- K. Wood Surfaces not Exposed to Public View: Finish with one coat primer; one coat enamel.
- L. Adjust equipment for smooth and quiet operation.

### **3.04 TOLERANCES**

- A. Guide Rail Alignment: Plumb and parallel to each other in accordance with ASME A17.1 and ASME A17.2.
- B. Car Movement on Aligned Guide Rails: Smooth movement, without any objectionable lateral or oscillating movement or vibration.

### **3.05 FIELD QUALITY CONTROL**

- A. See Section 01-4000 - Quality Requirements for additional requirements.
- B. Testing and inspection by regulatory agencies certified in accordance with ASME QE1 1 will be performed at their discretion.

**3.06 ADJUSTING**

- A. Adjust for smooth acceleration and deceleration of car to minimize passenger discomfort.
- B. Adjust with automatic floor leveling feature at each floor landing to reach 1/4 inch maximum from flush with sill.

**3.07 CLEANING**

- A. Remove protective coverings from finished surfaces.
- B. Clean surfaces and components in accordance with manufacturers written instructions.

**3.08 CLOSEOUT ACTIVITIES**

- A. Demonstrate proper operation of equipment to Owner's designated representative.

**3.09 PROTECTION**

- A. Do not permit construction traffic within car after cleaning.
- B. Protect installed products until Date of Substantial Completion.
- C. Touch-up, repair, or replace damaged products and materials prior to Date of Substantial Completion.

**3.10 MAINTENANCE**

- A. Provide Initial Maintenance Contract of elevator system and components in accordance with ASME A17.1 and requirements as indicated for 12 months from Date of Substantial Completion.
- B. Perform maintenance contract services using competent and qualified personnel under the supervision and direct employ of the elevator manufacturer or original installer.
- C. Include systematic examination, adjustment, and lubrication of elevator equipment.
- D. Perform work without removing cars from use during peak traffic periods.
- E. Provide emergency call back service during regular working hours throughout period of this maintenance contract.

**END OF SECTION**

BLANK PAGE

**SECTION 21-1300  
FIRE SUPPRESSION SPRINKLER SYSTEM**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

- A. The provisions of the General Requirements, Supplementary Requirements, and Division 1 apply to the plumbing work specified in this Division.
- B. The requirements of this section apply to the fire suppression system for the new building. Fire protection is not being added to the existing buildings.
- C. Provide all items, articles, materials, equipment, operations and/or methods listed, mentioned, shown and/or scheduled on the Drawings and/or in these Specifications, including all design, labor, supervision, services, permits, fees, and incidentals necessary and required to provide a complete and operable facility with complete systems as shown, specified, and required by applicable codes. Provide all labor and material and perform such other services necessary and reasonably incidental to the design and installation of an automatic sprinkler and standpipe system for all areas indicated on the Drawings and as required by the Governing Agency.

**1.02 QUALITY ASSURANCE**

- A. Contractor Qualifications:
  - 1. Established fire protection contractor regularly engaged in the design and installation of automatic fire sprinkler systems.
  - 2. Employ workers experienced and skilled in this trade.
  - 3. System Designer: Qualified and certified for the design of fire protection sprinkler systems. NICET level III or IV technician or Professional Engineer experienced in the design of sprinkler systems.
  - 4. Drawings shall be sealed by a licensed Professional Engineer experienced in fire protection.
- B. Governing Agency: All work in accordance with and accepted by the following hereafter referred to Governing Agencies:
  - 1. Fire Marshal State of Oregon.
  - 2. Fire Marshal for City of Coquille.
- C. Design Requirements:
  - 1. Comply with the latest issue of NFPA Standard 13.
  - 2. Design, lay out and install a hydraulically calculated wet and dry pipe system utilizing code approved automatic devices designed particularly for use in this type of system.
  - 3. Provide hydraulic calculation methods design data information in accordance with Chapter 8, NFPA 13. Include a 10 percent margin of safety for available water pressure and flow rate. Include all friction losses from point of flow test to remote sprinkler area.
  - 4. Fire Sprinkler Coverage: As required by the Governing Agency and including fire protection of all areas including the following:
  - 5. Occupancy Hazard is Light Hazard: Final Occupancy Hazard designation in accordance with the Governing Agency requirements.
  - 6. Seismic Restraint: Include load calculations for seismic restraints on drawings.
  - 7. Revisions to the Contractor's design required by the Governing Agency shall be at the Contractor's expense.
- D. Acceptable Manufacturers: All sprinkler specialty material Grinnell/Gem, Central, Reliable, Globe, Star, Viking, Automatic Sprinkler Corp. of America with UL or FM approval for use in automatic sprinkler systems. All materials and equipment suitable for 175 psi working pressure.

- E. Field Wiring: It is the intent of these specifications that all systems shall be complete and operable. Refer to all drawings and specifications, especially the electrical drawings, to determine voltage, phase, circuit ampacity and number of connections provided. Provide all necessary field wiring and devices from the point of connection indicated on the electrical drawings. All equipment shall be installed in compliance with the Electrical Code and the equipment's UL listing. Bring to the attention of the Architect in writing, all conflicts, incompatibilities, and/or discrepancies prior to bid or as soon as discovered.

### **1.03 WORK OF OTHER CONTRACTS**

- A. Work under this contract shall be conducted in a manner to allow for the future installations of such equipment or items listed in other sections of this Specification.

### **1.04 WORK OF OTHER DIVISIONS**

- A. Work under this Division shall be conducted in a manner to cooperate with the installation of such equipment or items as specified in other Divisions.
- B. Consult all Drawings and Specifications in this project and become familiar with all equipment to be installed. Coordinate all aspects of the construction with the other trades on the job to ensure that all work and materials required to provide a complete and operational facility are included in the bid.
- C. Provide AutoCAD drawings and files to other trades for coordination. Prepare accurate shop drawings showing the actual physical dimensions required for the installation. Submit prior to purchase/fabrication/installation of any of the elements involved in the coordination.
- D. Coordination of piping and heads is particularly critical in auditorium. Review all auditorium Drawings in preparation of design.

### **1.05 SUBMITTALS**

- A. Working Drawings:
  - 1. Prepare fire protection system working drawing showing locations and types of heads or outlets, alarm valves and devices, pipe sizes and cutting lengths, test tees and valves, drain valves, and other related items. Plans shall comply with the requirements of Chapter 8, 2013 NFPA 13, irregardless of the edition adopted by the Governing Agencies and used for design. Plans shall be stamped and signed by the licensed Professional Engineer responsible for the design.
  - 2. Provide 3 sets of drawings showing sprinkler head locations and layout coordinated with architectural ceiling details to the Architect for review prior to submitting details to the Governing Agencies.
  - 3. Provide 6 sets of drawings to the Architect to be provided to Insurance Underwriter for approval.
  - 4. Provide 6 sets of Drawings to designated representatives of the Fire Marshal for approval.
  - 5. Then provide 6 sets of approved Drawings to the Architect for final review.
- B. Submittals:
  - 1. Sprinkler Heads: Product data for each type of head.
  - 2. Alarm flow or pressure switches.
  - 3. Fire department connection.
  - 4. Backflow prevention valve assembly.
  - 5. System control valves.
  - 6. Piping materials.
  - 7. Alarm bell.
  - 8. Miscellaneous equipment.
  - 9. Dry valve and compressor.
- C. Test Reports: Submit certificates of completion of tests and inspections.



## 1.06 EXTRA STOCK

- A. Additional Heads: Provide number, type and temperature rating installed as required to meet NFPA 13 requirements.
- B. Storage Cabinet: Provide as required to receive reserve sprinkler heads and special installation tools required.
- C. Index Label: Provide for each head indicating manufacturer, model, orifice, size or K-factor, and temperature rating. Also provide inside cabinet a list of heads stored within and brief description of where installed.

## 1.07 WARRANTY

- A. Furnish, prior to application for final payment, three copies of written and signed guarantee effective a period of one year from date of completion and acceptance of entire project; agree to correct, repair and/or replace defective materials and/or equipment or the results of defective workmanship without additional expense to the Owner. Where no response satisfactory to the Owner has occurred within three working days from the written report of a warranty covered defect, the Contractor shall agree to pay for the cost of repair of the reported defect by a Contractor of the Owner's choice.
- B. Where the manufacturer's guarantee exceeds one year, the longer guarantee shall govern and include the Contractor's labor.
- C. Warranty period shall start when all phases of construction are complete.

## PART 2 PRODUCTS

### 2.01 MATERIALS AND EQUIPMENT

- A. Miscellaneous Sprinkler Specialties: Complete system including all items required by the Governing Agency including but not limited to:
  - 1. Electric alarm switch and indoor and outdoor 120 V alarm bell or water motor gong.
  - 2. Valve monitoring switches with two outputs (one to fire alarm & one to sprinkler alarm bell).
  - 3. Fire department hose connections.
  - 4. Wiring from the alarm switches to the point of connection in the Fire Alarm Control Panel. Coordinate with the Electrical Work specified in Division 28.
- B. Water Service Connection Backflow Preventer:
  - 1. Connect to primary water service with code approved double check valve assembly made up of two brass, internally spring loaded check valves, shut-off valves and test cocks. Valves shall be approved by serving jurisdiction. Provide with integral tamper switches allowing direct connection to the fire alarm system.
  - 2. When required by serving utility, include a smaller bypass double check assembly and meter. Install backflow preventer in a precast concrete vault indicated on the Drawings. See civil drawings for more information.
- C. Sprinkler Heads: Approved heads with temperature ratings required for service indicated. All shall be quick response early suppression type and rated heads.
  - 1. Unfinished Areas: Upright, pendant or sidewall spray type, plain bronze.
  - 2. Finished Areas: Chrome plated recessed and sidewall heads in finished ceilings, and where piping is exposed use chrome plated upright heads.
  - 3. Dry pendant or dry sidewall heads for small areas subject to freezing. Chrome plated at interior finished locations and plain bronze in unfinished areas and exterior locations.

4. At Contractor's option, flexible sprinkler head drops may be used in lieu of rigid piping. Hose assembly shall be UL 2443 listed and FM 1637 approved. Devices shall approved per be IBC 1621 or ASCE 7 as an alternative to seismic escutcheons. Ceiling attachment bracket shall be seismically certified. Hose assembly constructed of fully welded corrugated 304 stainless steel hose with stainless steel overbraid with threaded stainless steel pipe fittings. Device shall be listed for 175 PSI working pressure. Hose and 304 stainless steel threaded ends shall be welded per AHSI / AWS B2.1-00. No gaskets, O-rings, flares, or similar mechanical joints permitted. FlexHead Industries or equal.
- D. Escutcheons: Provide polished chrome escutcheons on pipe extending through finished walls and ceilings. Provide oversized escutcheon to comply with current code.
- E. Underground Water Piping: Materials and installation methods shall comply with NFPA 24. Ductile cast iron water pipe; ANSI A-21.51; with mechanical joints, ANSI A-21.10 and ANSI A21.11; and with concrete thrust blocks as detailed on the Drawings. Where acceptable to the serving utility, PVC pipe and fittings, Class 200, AWWA C900, may be installed 5 feet outside of the building line.
- F. Above Ground Water Piping: Use standard weight (schedule 40) black or galvanized steel pipe ASTM A53, A135, or A795, and cast iron screwed or mechanical joint fittings especially adapted and approved for sprinkler work. Use reducing fittings where changes in pipe size occur. Bushings are prohibited. Galvanized pipe required for dry system.
- G. At Contractor's option, Schedule 10 black or galvanized steel pipe ASTM A135 or ASTM A795, and mechanical joint fittings specifically approved for sprinkler use, may be substituted for the black steel pipe specified above. Pipe shall be UL listed and FM approved for 300 psi working pressure. Pipe must have a CRR of 1.00 or greater. Galvanized pipe required for dry system.
- H. At Contractor's option, thin wall threadable steel pipe, ASTM A135 or A795, and cast iron or malleable iron screwed fittings 1½" and smaller, approved for sprinkler work. Galvanized pipe required for dry system.
- I. Valves: UL and/or FM listed for fire protection service.
  1. Iron body OS&Y pattern, bronze mounted double disc, parallel seat.
  2. Iron body butterfly style with EPDM liner, bronze disc with lever or indicating type gear operator.
  3. Bronze body ball valve, three-piece design, with approved operator.
  4. Where required by Governing Agency, provide wall or post style indicating valves.
  5. Standpipe Valves: Angle or straight pattern rough brass gate valve with cap and retaining chain.
- J. Valve Monitoring Switches: Provide approved monitoring switches where shown on the Drawings or required by Governing Agency. In vaults and other areas where flooding conditions may occur, provide submersible type switches.
- K. Guards: Standard manufacture.
- L. Fire Department Connection: Exposed/Free standing with riser sleeve, cast brass construction with clappers on each inlet and threads matching the fire district equipment. Number of inlets and sizes as approved by the fire district. Standard, Allenco, Seco, Potter-Roemer, or acceptable substitute.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Connect to water supply source as shown on Drawings, check adequacy, and call any deficiency to attention of Architect. Coordinate with work in Division 22 and 23.

- B. Install all piping in a true and even manner with lines pitched for drainage and system arranged so that it can be entirely emptied of water. Install hangers at all branch line connections to cross mains and at all other points as required in hereinbefore specified Underwriters Laboratories, Inc. and NFPA standards.
- C. Support all pipe work from building construction with mild steel hangers spaced not more than 12 feet on centers. Support mains independently of branches, and in no case shall branch hangers assume any portion of the weight of mains. Provide seismic restraints and flexible connections in accordance with building code requirements.
- D. Locate sprinkler heads in repeating, modular pattern, centered and accurately coordinated with ceiling grid as indicated. Conceal all piping unless indicated otherwise. Coordinate design with lighting and exposed HVAC duct layout in areas without ceilings.
- E. Locate and install the required fire sprinkler alarm, flow, and test and drain valves where required by the Governing Agency.
- F. Where sprinkler lines penetrate fire rated partitions, provide fire stopping system in accordance with Section 22 0500.
- G. Where sprinkler lines penetrate classroom or auditorium walls, provide acoustic seal. See Section 22 0500 for more information.

### **3.02 TEST**

- A. Test all pipes to a hydrostatic pressure of 200 psi and maintain for four hours minimum. Perform other tests as directed by Governing Agency.
- B. Test to be performed on all new and existing systems in the building.

### **3.03 PAINT**

- A. Paint all exposed piping and hangers in accordance with Section 09 9100. Do not paint heads.

### **3.04 CERTIFICATE OF COMPLETION**

- A. Obtain and deliver to Owner a certificate, in duplicate, stating that system as installed has been inspected and accepted by authorities and/or agencies having jurisdiction, and that all regulations affecting work have been satisfied. Submit an acceptable certificate to the Owner before final payment is requested.
- B. Certificate: Minimum NFPA Figure 16-1 information per NFPA 13.

**END OF SECTION**

BLANK PAGE

**SECTION 22-0500**  
**PLUMBING MATERIALS AND METHODS**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

- A. The provisions of the General Requirements, Supplementary Requirements, and Division 1 apply to the plumbing work specified in this Division.
- B. The requirements of this Section apply to the plumbing systems specified in these Specifications and in other Division 22 sections.
- C. Provide all items, articles, materials, equipment, operations and/or methods listed, mentioned, shown and/or scheduled on the Drawings and/or in these Specifications, including all labor, supervision, services, permits, fees, and incidentals necessary and required to provide a complete and operable facility with complete systems as shown, specified, and required by applicable codes.
- D. The work shall include, but not be limited to, the following systems:
  - 1. Water, sanitary sewer, and storm sewer service complete per serving utility company requirements.
  - 2. Service and distribution piping including valves, supports, insulation, etc.
  - 3. Complete plumbing systems, including fixtures, trim, equipment, etc.
  - 4. Rough-in and final connection of plumbing equipment and fixtures furnished under other Divisions of this Specification.
  - 5. Piping to and connection of equipment or fixtures furnished outside of these Specifications and Contract but described on the Drawings.
  - 6. Special systems as specified herein.
- E. Advise subcontractor, suppliers, and vendors involved in the work specified in this Section of the applicable requirements.

**1.02 QUALITY ASSURANCE**

- A. All work and materials shall conform to all applicable local and state codes and all federal, state and other applicable laws and regulations. All clarifications and modifications which have been cleared with appropriate authorities are listed under the applicable sections. All electrical products shall bear the label of a recognized testing laboratory such as UL or CSA.
- B. Whenever the requirements of the Specifications or Drawings exceed those of the applicable code or standard, the requirements of the Specifications and Drawings shall govern.
- C. Codes and Standards: Comply with the provisions of the following referenced codes, standards and specifications:
  - 1. Federal Specifications (FS)
  - 2. American National Standards Institute (ANSI)
  - 3. National Electrical Manufacturer's Association (NEMA)
  - 4. National Fire Protection Association (NFPA)
  - 5. Underwriters Laboratories, Inc. (UL)
  - 6. Factory Mutual (FM)
  - 7. International Building Code (IBC) with State and Local Amendments
  - 8. International Mechanical Code (IMC) with State and Local Amendments
  - 9. Uniform Plumbing Code (UPC) with State and Local Amendments
  - 10. American Society for Testing and Materials (ASTM)
  - 11. Americans with Disabilities Act (ADA)
  - 12. International Fire Code (IFC) with State and Local Amendments
  - 13. Energy Policy Act (EPAAct)
  - 14. Manufacturers Standardization Society (MSS)
  - 15. National Sanitation Foundation (NSF)
  - 16. American Gas Association (AGA)

- D. Each piece of equipment furnished shall meet all detailed requirements of the Drawings and Specifications and shall be suitable for the installation shown. Equipment not meeting all requirements will not be acceptable, even though specified by name. Where two or more units of the same class of equipment are furnished, use product of the same manufacturer; component parts of the entire system need not be products of same manufacturer. Furnish all materials and equipment, new and free from defect and of size, make, type and quality herein specified or approved by the Architect. All materials shall be installed in a neat and professional manner.
- E. All apparatus shall be built and installed to deliver its full rated capacity at the efficiency for which it was designed.
- F. The Drawings and Specifications are complementary. What is called for by one shall be as though called for by both.
- G. Drawings: Do not scale drawings for roughing-in measurements, nor use as shop drawings. Make field measurements and prepare shop drawings. See Article 3.01 for more requirements. Coordinate work with shop drawings of other specification divisions.
- H. Field Wiring: It is the intent of these specifications that all systems shall be complete and operable. Refer to all drawings and specifications, especially the electrical drawings, to determine voltage, phase, circuit ampacity and number of connections provided. Provide all necessary field wiring and devices from the point of connection indicated on the electrical drawings. All equipment shall be installed in compliance with the Electrical Code and the equipment's UL listing. Bring to the attention of the Architect in writing, all conflicts, incompatibilities, and/or discrepancies prior to bid or as soon as discovered.

### **1.03 WORK OF OTHER CONTRACTS**

- A. Work under this contract shall be conducted in a manner to allow for the future installations of such equipment or items listed in other sections of this Specification.

### **1.04 WORK OF OTHER DIVISIONS**

- A. Work under this Division shall be conducted in a manner to cooperate with the installation of such equipment or items as specified in other Divisions.
- B. HVAC piping systems, fuel piping systems, fire suppression piping systems, and control devices and control wiring relating to the heating and air conditioning systems are specified under other Divisions of these Specifications except for provisions or items specifically noted on the Drawings or specified herein.
- C. Consult all Drawings and Specifications in this project and become familiar with all equipment to be installed. Coordinate all aspects of the construction with the other trades on the job to ensure that all work and materials required to provide a complete and operational facility are included in the bid.
- D. All sections of Division 22 are interrelated and shall be considered in their entirety when interpreting any material, method, or direction listed in any section of Division 22. Individual sections are not written for specific subcontractors or suppliers but for the general contractor.

### **1.05 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES (SUBMITTALS)**

- A. Submit in accordance with Division 1 full technical and descriptive shop drawing data on proposed materials and equipment as detailed in each section.
- B. The Contractor shall verify that all equipment submitted can be delivered and installed within the time constraints of the construction period.
- C. Include the manufacturer, type, style, catalog number, complete specification, certified dimensions, and description of physical appearance for each item and option submitted. Reproduction of catalog data sheets shall be clean and legible to show all details, including gauge of metal used.

- D. Include only information on exact equipment to be installed, not general catalogs of the manufacturer. Where sheets show proposed equipment as well as other equipment, identify proposed equipment with rubber stamp arrow or similar concise method.
- E. Submit with each copy a transmittal letter verifying that all included equipment submittals have been carefully considered for quality, dimensions, function, and have been coordinated with the Drawings and Specifications. Guarantee that proposed materials will meet or exceed the quality and function of those specified.
- F. Include field wiring diagrams and connection diagrams for all control and/or low voltage systems, including floor plans.
- G. Submittal Review: The submittal review process is a means to provide quality control. The action noted to be taken (or where conflicts with the contract documents are not noted) shall not be interpreted by the Contractor as automatic "change orders." Approval of the data for substitution and shop drawings shall not eliminate the Contractor's responsibility for compliance with Drawings or Specifications, nor shall it eliminate the responsibility for freedom from errors of any sort in the data discovered prior to or after the review process. Deviations, discrepancies, and conflicts between the submittals and the Contract Documents shall be called to the Architect's attention in writing at the time of transmittal of the data.
- H. Submittals shall be in the form of PDF documents. Arrange submittals numerically with specification sections identified in tabs. All required sections shall be submitted at one time. **Partial submittals will be rejected without review.**

#### 1.06 PRODUCT SUBSTITUTION

- A. Materials other than those specified may be approved for this project providing a written request is submitted to the Architect prior to bid in accordance with Instructions to Bidders. Requests shall include complete specifications, dimensions, manufacturer and catalog number for each item for which approval is desired. If, in the opinion of the Architect, the material is not complete or if it is not an acceptable substitute, he may reject it. The Architect's evaluation will be based solely on the material submitted.

#### 1.07 CHANGE ORDERS

- A. All supplemental cost proposals by the Contractor shall be accompanied by a complete itemized breakdown of labor and materials without exception. At the Architect's request, the Contractor's estimating sheets for the supplemental cost proposals shall be made available to the Architect. Labor must be separated and allocated for each item of work.

#### 1.08 RECORD DOCUMENTS

- A. Project Record (As-Installed) Drawings:
  1. Maintain a set of record drawings on the job site as directed in Division 1.
  2. Keep Drawings clean, undamaged, and up to date.
  3. Record and accurately indicate the following:
    - a. Depths, sizes, and locations of all buried and concealed piping and all cleanouts, whether concealed or exposed, dimensioned from permanent building features.
    - b. Locations of all valves with assigned tag numbers.
    - c. Changes, additions, and revisions due to change orders, obstructions, etc. Eradicate extraneous information.
    - d. Locations of tracer wire terminal points.
    - e. Model numbers of installed equipment.
  4. Make Drawings available when requested by Architect for review.
  5. Submit as part of the required Project Closeout documents. Final submittal will be in the form of reproducible drawings.
  6. Quality of entire set of project record drawings to match the quality of the contract documents; quality to be judged by Architect. Computer-aided design drafting (CADD) shall be used to complete project record drawings. Use standards set in contract documents. Note field modifications, all addenda and change order items on project record drawings. If deficiencies are found in either the quality or the accuracy of the drawings, they will be returned unapproved. Additional review of subsequent submissions shall be at the Contractor's expense.

- B. Operating and Maintenance Manuals: Submit Operating and Maintenance Instructions, including manufacturer's service data, wiring diagrams, and parts lists and vendors for all serviceable items of equipment, valve charts, balancing data, final control diagrams showing final set points, duct and piping pressure test reports, equipment startup records, and any additional equipment added by change order. Provide any performance curves, data, and model numbers from submittals. Comply with provisions of Division one where applicable to the mechanical work. Submittal shall be in the form of a PDF file per specification section. Arrange submittals numerically with equipment type or classification identified in tabs. Manufactures O&M manuals shall be provided as a single PDF file that can be hyper-linked by owner for reference. O&M manuals that are a series of PDF files will not be accepted.

## **1.09 WARRANTY**

- A. Furnish, prior to application for final payment, three copies of written and signed guarantee effective a period of one year from date of completion and acceptance of entire project; agree to correct, repair and/or replace defective materials and/or equipment or the results of defective workmanship without additional expense to the Owner. Where no response satisfactory to the Owner has occurred within three working days from the written report of a warranty covered defect, the Contractor shall agree to pay for the cost of repair of the reported defect by a Contractor of the Owner's choice.
- B. Where the manufacturer's guarantee exceeds one year, the longer guarantee shall govern and include the Contractor's labor.
- C. Warranty period shall begin once all phases of construction are complete.

## **PART 2 PRODUCTS**

### **2.01 GENERAL**

- A. General: Provide all new materials and equipment, identical to apparatus or equipment in successful operation for a minimum of two years. Provide materials of comparable quality omitted here but necessary to complete the work. Maximum allowable variation from stated capacities, minus 5% to plus 10% as approved in each case.
- B. Compatibility: Provide products which are compatible with other portions of the work and provide products with the proper or correct power and fuel-burning characteristics, and similar adaptations for the project.
- C. Efficiency: Service (Domestic) Water Heating Equipment shall comply with ASHRAE Standard 90.1-2016 and the State Energy code. Where equipment efficiencies are indicated, the use of alternate or substitute manufacturer's equipment with lower efficiencies is not permitted.
- D. Storage and Handling:
  - 1. Delivery: Deliver to project site with manufacturer's labels intact and legible.
  - 2. Handling: Avoid damage.
  - 3. Storage: Inside protected from weather, dirt and construction dust. Where necessary to store outside, elevate well above grade and enclose with durable, waterproof wrapping.

### **2.02 ACCESS PANELS**

- A. Manufacturers: Inryco/Milcor, Bilco, Elmdor, Karp, Potter-Roemer or accepted substitute. Inryco/Milcor Style DW, K, or M panels as required by construction.
- B. Construction: Flush style, fire rated in fire rated partitions and ceilings. Provide flush key cylinder locks on all access panels less than 8' above the floor in public spaces. Turn keys over to owners at project completion. Screwdriver latches on all others. Stainless steel construction when installed in locker room shower ceilings or restroom walls.



### 2.03 EXPANSION JOINTS AND LOOPS

- A. Flexible Expansion/Seismic Loop: Factory fabricated assembly consisting of two 90 degree elbows, two lengths of flexible hose, and a 180 degree return bend to allow free movement in 3 axis. Return bend shall include attachment point for support and a drain/vent fitting. Hose shall be corrugated metal style with metal overbraid. Connections to match piping system except connection 2" and larger shall be flanged style. Copper or bronze construction for potable water systems. Metraflex "Metraloop."

### 2.04 METERS AND GAUGES

- A. General: Install meters and gauges where shown on the plans or specified elsewhere in these specifications.
- B. Pressure-Temperature Test Plugs:
  - 1. 1/4" or 1/2" NPT fitting of solid brass capable of receiving either an 1/8" OD pressure or temperature probe and rated for zero leakage from vacuum to 1000 psig. Neoprene valve core for temperatures to 200 deg. F., Nordel to 350 deg. F.
  - 2. Provide for each test plug a pressure gauge adapter with 1/16" or 1/8" OD pressure probe.
  - 3. Furnish a test kit containing one 2-1/2" dial pressure test gauge of suitable range, one gauge adapter with 1/16" or 1/8" OD probe and two 5" stem pocket test thermometers – one 0 to 220 degrees F and one 50 to 550 degrees F. Turn the kit over to the Architect.
  - 4. Cisco "P/T Plugs," Peterson "Pete's Plug" or approved substitute.
- C. Thermometers: Liquid-in-glass, adjustable stem, separable sockets, plus 40 to 240 degrees F range (unless indicated otherwise). Weiss numbers are listed. Equivalent Taylor, Terrice, Weksler or approved substitute.
  - 1. Wide case (9") in equipment rooms and all major equipment items. Weiss "9VS" series.
  - 2. Narrow case (7") in all other locations. Weiss "7VS" series.
- D. Pressure Gauges: Install on discharge of all pumps and where shown on Drawings 4-1/2" dial, 0-100 psig graduation pressure gauges with Ashcroft No. 1106 pulsation dampers and stop cocks. Weiss UGE-1 or equivalent Ashcroft, Marsh, Terrice, Weksler.

### 2.05 VALVES

- A. General: Provide factory fabricated valves of the type, body material, temperature and pressure class, and service indicated. Bronze gate, globe and check valves shall comply with MSS-SP-80. Ball valves shall comply with MSS-SP-110. Iron gate and globe valves shall comply with MSS-SP-70. Iron check valves shall comply with MSS-SP-71. Butterfly valves shall comply with MSS-SP-67. Valve size same as connecting pipe size.
- B. Acceptable Manufacturers: Milwaukee, Crane, Grinnell, Nibco, Hammond, Stockham, Legend, Watts, and Walworth. Grooved end valves Victaulic, Gruvlock, or accepted substitute. NIBCO numbers are given except as noted. Where possible, provide valves from a single manufacturer.
- C. Valve styles: Domestic hot and cold water.
  - 1. Valves 2" and Smaller:
    - a. Ball: Two-piece, Lead free certified, bronze body, full port, 600 psi WOG, Fig. T/S-585-70.
    - b. Check: Lead free certified, Bronze body, swing check, 200 psi WOG, T/S-413B (bronze disc) or T/S-413Y (Teflon disc).
  - 2. Valves 2" through 12":
    - a. Ball: Three-piece, Lead free certified, bronze body, full port, 600 psi WOG, T/S-595Y.
    - b. Butterfly: Ductile iron body, aluminum bronze disc, 200 psi WOG, Lugged body – LD-2000, Wafer body – WD-2000, Grooved body – GD-4765.
- D. Butterfly Valve Operators: Locking lever for shut-off service; "Memory Stop" for lever handle with 10 position throttling plate for throttling service; gear operator with babbitt sprocket rim for chain-operated valves and gear operators on all 8" or larger valves.

- E. Butterfly Valve Style: Lug-type with cap screws for all valves utilized for equipment isolation for servicing. Lug and grooved style valves shall be capable for use as isolation valves and recommended by manufacturer for dead-end service at full system pressure.
- F. Insulated Valves: Install extended-stem valves in all piping specified as insulated, and arrange in the proper manner to receive insulation.
- G. Selection of Valve Ends (Pipe Connections): Select and install valves with ends matching the types of pipe/tube connections.

## 2.06 HANGERS AND SUPPORTS

- A. General: Provide factory-fabricated horizontal piping hangers, clamps, hanger rod, inserts, supports, etc., of the indicated MSS type and size. The Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry Practice SP-58 and SP-69 are referenced in this section.
- B. Manufacturers: B-Line, Carpenter & Paterson, Grinnell, Michigan, Superstrut, Tolco, Erico, or accepted substitute. Grinnell figure numbers in parentheses where applicable (or other manufacturers as noted).
- C. Corrosion Protection: Provide materials which are zinc plated or factory painted to prevent corrosion. Prevent electrolysis in the support of copper tubing by the use of copper hangers (copper coated is not sufficient), strut cushion, or at least 2 layers of UPC 10 mil tape.
- D. Seismic Requirements: Provide seismic restraints in accordance with OSSC Section 1613. Design restraint systems in accordance with "Seismic Restraint Manual: Guidelines for Mechanical Systems," Second Edition, 1998, SMACNA, or "A Practical Guide to Seismic Restraint" ASHRAE RP-812, 1999.
- E. Horizontal Piping Hangers and Supports:
  - 1. Adjustable Clevis Hanger: MSS Type 1 (Fig. 260).
  - 2. Adjustable Band Hanger: MSS Type 7 (Fig. 97), fabricated from steel.
  - 3. Adjustable Swivel-Band Hanger: MSS Type 10 (Fig. 70).
  - 4. Clamp: MSS Type 4 (Fig. 212, 216).
  - 5. Double-Bolt Clamp: MSS Type 3 (Fig. 295A, 295H), including pipe spacers.
  - 6. Adjustable Saddle-Support: MSS Type 36 (Fig. 258) and MSS Type 37 (Fig. 259), including saddle, pipe and reducer. Fabricate base-support from steel pipe and include cast-iron flange or welded-steel plate.
  - 7. Channel Support System: Galvanized, 12 gauge channel and bracket support systems, single or double channel as indicated on the Drawings or as required by piping and equipment weights. Grinnell "Power Strut" channel. Acceptable Manufacturers: Super Strut, Globestrut, Bee, Kindorf or Unistrut.
- F. Vertical Pipe Clamps:
  - 1. Two-Bolt Riser Clamp: MSS Type 8 (Fig. 261).
  - 2. Four-Bolt Riser Clamp: MSS Type 42 include pipe spacers at inner bolt-holes.
- G. Hanger Attachment:
  - 1. Hanger Rod: Rolled threads, zinc plated. Right hand threaded.
  - 2. Turnbuckles: MSS Type 13 (Fig. 230).
  - 3. Weldless Eye-Nut: MSS Type 17 (Fig. 290).
  - 4. Malleable Eye-Socket: MSS Type 16 (Fig. 110R).
  - 5. Clevises: MSS Type 14 (Fig. 299).
- H. Building Attachments:
  - 1. Concrete Inserts: MSS Type 18 (Fig. 282), steel or Grinnell Power-Strut PS349 continuous channel. Acceptable Manufacturers: Michigan Hanger, Globestrut, Unistrut, Super Strut.
  - 2. Clamps: MSS Type 19 (Fig. 285, 281), Type 20, 21 (Fig. 225, 226, 131), Type 23 (Fig. 86, 87, 88), Type 25 (Fig. 227), Type 27 through 30 where applicable.

## 2.07 IDENTIFICATION MARKERS

- A. Pipe Markers:
  - 1. Adhesive pipe markers of width, letter size and background color conforming to ANSI A13.1.
  - 2. Acceptable Manufacturers: Brady B946 with arrow banding tape or similar Seaton, Zeston, MSI.
- B. Nameplates:
  - 1. Engraved nameplates, 1/16" thick, laminated 2-ply plastic, bottom ply white, outer ply black, letters formed by exposing bottom ply.
  - 2. Size: 2" by 4" nameplates with 1/4" high letters.
- C. Valve Tags:
  - 1. 2" diameter, 18-gauge polished brass tags with 3/16" chain hole and 1/4" high stamped, black-filled service designation.
  - 2. Acceptable Manufacturers: Seaton, Brady, MSI.

## 2.08 PENETRATION FIRE STOPPING

- A. Through-penetration fire stopping system tested and listed by Underwriters Laboratories. 3M, Metacaulk, SpecSeal, or approved.
- B. Select system for proper application based on wall construction, type of penetrating item, wall rating, etc.

## PART 3 EXECUTION

### 3.01 LAYOUT AND COORDINATION

- A. Site Examination: Before starting work, carefully examine site and all contract Drawings. Become thoroughly familiar with conditions governing work on this project. Verify all indicated elevations, building measurements, roughing-in dimensions and equipment locations before proceeding with any of the work.
- B. Utility Locations: The location of existing utilities, wires, conduits, pipes, ducts, or other service facilities are shown in a general way only on the Drawings and are taken from existing records. Ascertain whether any additional facilities other than those shown on the plans may be present and determine the exact location and elevations of all utilities prior to commencing installation.
- C. Sleeves, Inserts, Cast-in-Place Work: Provide sleeves, inserts, anchoring devices, cast-in-place work, etc. which must be set in concrete sequenced at the proper time for the project schedule.
- D. Coordination:
  - 1. The Drawings are based on equipment of a certain manufacturer and may be identified as such. Where alternate manufacturers or approved substitutes are incorporated into the work, any required design changes are the responsibility of the Contractor. Such changes may include changes in utility or system connection sizes, location, or orientation, service clearances, structural support or acoustic considerations.
  - 2. Prepare accurate AutoCAD shop drawings showing the actual physical dimensions required for the installation for piping and plumbing devices. Submit drawings prior to purchase/fabrication/installation of any of the elements involved in the coordination. Provide drawing files to other trades for coordination.
  - 3. Cooperate with other trades in furnishing material and information for sleeves, bucks, chases, mountings, backing, foundations and wiring required for installation of mechanical items.
  - 4. Coordinate all work with other trades and determine in advance where interfacing of the mechanical work and other work are required to be connected together. Provide all materials and equipment to make those connections. Submit shop drawings showing required connections where special conditions exist.

- E. Discrepancies: Report immediately any error, conflict or discrepancy in Plans, Specifications and/or existing conditions. Do not proceed with any questionable items of work until clarification of same has been made. Should rearrangement or re-routing of piping be necessary, provide for approval the simplest layout possible for that particular portion of the work.

### **3.02 UTILITY COORDINATION**

- A. Utility Coordination: Coordinate all aspects of the incoming plumbing utility services indicated with the City Engineer, serving utility, and the off-street improvements Contractor. Requirements of the utility company which exceed the provisions made on the Drawings or covered by these Specifications shall take precedence. Provisions made on the Drawings or Specifications in excess of the utility company's requirements shall take precedence. No additional compensation will be allowed the Contractor for connection fees or additional work or equipment not covered in the Drawings or Specifications which are a result of policies of the serving utilities.

### **3.03 MECHANICAL EQUIPMENT WIRING**

- A. Provide all mechanical equipment motors, automatic temperature, limit, float and similar control devices required, with wiring complete from power source indicated on Electrical Drawings.
- B. Provide properly rated motor overload and undervoltage protection and all manual or automatic motor operating devices for all mechanical equipment.
- C. Equipment and systems shown on the Drawings and/or specified, are based upon requirements of specific manufacturers which are intended as somewhat typical of several makes which may be approved. Provide all field wiring and/or devices necessary for a complete and operable system including controls for the actual selected equipment/system.
- D. Provide all starters for mechanical motors. Review Electrical Specifications and Drawings to determine which mechanical motor starters will be provided under the Electrical Specification Sections and provide all others.

### **3.04 GENERAL INSTALLATION**

- A. Locating and Positioning Equipment: Observe all Codes, Regulations and good common practice in locating and installing mechanical equipment and material so that completed installation presents the least possible hazard. Maintain adequate clearances for repair and service to all equipment and comply with Code requirements.
- B. Arrangement: Arrange piping parallel with primary lines of the building construction, and with a minimum of 7' overhead clearance in all areas where possible. Unless indicated otherwise, conceal all piping. Locate operating and control equipment properly to provide easy access, and arrange entire mechanical work with adequate access for operation and maintenance. Give right-of-way to piping which must slope for drainage. Set all equipment level or as recommended by manufacturer. Under no conditions shall beams, girders, footings or columns be cut for mechanical items. Casting of pipes into concrete is prohibited unless so shown on Drawings.
- C. Drip Pans: Provide drip pans under all domestic hot water heaters and all above ceiling in-line pumps and cooling coils or as noted on drawings. Locate pan immediately below piping and equipment, and extend a minimum of 6" on each side and lengthwise 18" beyond equipment being protected. Fabricate pans 2" deep, of reinforced 20 gauge galvanized sheet metal with watertight seams and rolled or hemmed edges. Provide 3/4" drainage piping, properly discharged to over floor drain or as shown on the Drawings. Comply with Mechanical Code for overflow protection and pipe sizing.

- D. Access Panels: Provide access panels with proper backing reinforcement for all equipment, dielectric unions, valves and items requiring service and installed above ceilings, behind walls, or in furring, complete with correct frame for type of building construction involved. Exact size, number and location of access panels are not necessarily shown on Drawings. Use no panel smaller than 12" by 12" for simple manual access or smaller than 16" x 20" where personnel must pass through.
- E. Adjusting: Adjust and calibrate all automatic mechanical equipment, mixing valves, flush valves, float devices, etc. Adjust flow rates at each piece of equipment or fixture.
- F. Building Vapor Barrier: Wherever the building insulation vapor barrier is penetrated by piping, hangers, conduits, etc., provide clear self-adhesive tape recommended by the insulation manufacturer around the penetrations.

### 3.05 VALVE INSTALLATION

- A. General: Comply with the following requirements:
  1. Install valves where required for proper operation of piping and isolation of equipment, including valves in branch lines where necessary to isolate sections of piping, and where shown on the drawings. Install valves at low points in piping systems that must be drained for service or freeze protection.
  2. Locate valves in accessible spaces (or behind access panels) and so that separate support can be provided when necessary.
  3. Install valves with stems pointed up, in the vertical position where possible, but in no case with stems pointed downward from a horizontal plane.
- B. Insulated Valves: Install extended-stem valves in all piping specified as insulated, and arrange in the proper manner to receive insulation.
- C. Valve Access: Provide access panels to all valves installed behind walls, in furring or otherwise inaccessible.

### 3.06 INSTALLATION OF HANGERS AND SUPPORTS

- A. General: Proceed with the installation of hangers, supports and anchors only after the required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) the proper placement of inserts, anchors and other building structural attachments.
  1. Install hangers, supports, clamps, and attachments to support piping and equipment properly from the building structure. Use no wire or perforated metal to support piping, and no supports from other piping or equipment. For exposed continuous pipe runs, install hangers and supports of the same type and style as installed for adjacent similar piping.
  2. Prevent electrolysis in the support of copper tubing by the use of at least 2 layers of UPC listed 10 mil tape at all bearing surfaces or strut clamp cushion. Copper plated hangers alone are not sufficient.
  3. Support fire sprinkler piping independently of other piping and in accordance with NFPA Pamphlet 13.
  4. Arrange supports to prevent eccentric loading of joists and joist girders. Locate supports at panel points only.
- B. Provisions for Movement:
  1. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate the action of expansion joints, expansion loops, expansion bends and similar units. Install specified seismic restraints to restrict excessive movement.
  2. Install hangers and supports so that equipment and piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
  3. Install hangers and supports to provide the indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 are not exceeded. Comply with the following installation requirements:
    - a. Clamps: Attach clamps, including spacers (if any), to piping outside the insulated piping support. Do not exceed pipe stresses allowed by ANSI B31.

- b. Insulated Pipe Supports: Insulated pipe supports shall be supplied and installed on all insulated pipe and tubing.
- c. Load Rating: All insulated pipe supports shall be load rated by the manufacturer based upon testing and analysis in conformance with ASME B31.1, MSS SP-58, MSS SP-69 and MSS SP-89.
- d. Support Type: Manufacturer's recommendations, hanger style and load shall determine support type.
- e. Insulated Piping Supports: Where insulated piping with continuous vapor barrier or where exposed to view in finished areas is specified, install hard maple wood insulation shields (Elcen Fig. 216) or steel pipe covering protection shields (MSS type 39) at each hanger.

C. Pipe Support:

- 1. Vertical Spacing: Support at base, at equivalent of every floor height (maximum 10' as required by Code) and just below roof line.
- 2. Screwed or Welded Steel or Copper Piping: Maximum hanger spacing shall be as follows:

	<u>Steel</u>	<u>Copper</u>
1-1/4" and smaller	7' span	6' span
1-1/2" pipe	9' span	6' span
2" pipe	10' span	10' span
2-1/2" & larger	12' span	10' span

- 3. Cast Iron Soil Pipe:
  - a. Hubless and Compression Joint: At every other joint except when developed length exceeds 4', then at each joint.
  - b. Additional Support: Provide at each horizontal branch and/or at concentrated loads to maintain alignment and prevent sagging.
- 4. Install additional hangers or supports at concentrated loads such as pumps, valves, etc. to maintain alignment and prevent sagging.
- 5. Support Rod: Hanger support rods sized as follows:

<u>Pipe and Tube Size</u>		<u>Rod Size</u>	
<u>Inches</u>	<u>mm</u>	<u>Inches</u>	<u>mm</u>
1/2" to 4"	12.7 to 101.6	3/8"	9.5
5" to 8"	127.0 to 203.2	1/2"	12.7
10" to 12"	254.0 to 304.8	5/8"	15.9

- 6. Provide manufactures approved channel continuously below all horizontal PEX or other plastic pipe where hung from structure.

- D. Adjust hangers and supports to bring piping to proper levels and elevations.
- E. Provide all necessary structural attachments such as anchors, beam clamps, hanger flanges and brackets in accordance with MSS SP-69. Attachments to beams wherever possible. Supports suspended from other piping, equipment, metal decking, etc., are not acceptable.
- F. Horizontal banks of piping may be supported on common steel channel member spaced not more than the shortest allowable span required on the individual pipe. Maintain piping at its relative lateral position using clamps or clips. Allow lines subject to thermal expansion to roll axially or slide. Size channel struts for piping weights.
- G. Installation of drilled-in concrete anchors shall comply with the manufacturer's instructions for working load, depth of embedment, and spacing between anchors and from the edge of the slab. Use only wedge style anchors.
- H. Seismic Restraints: Install restraints where recommended in SMACNA "Seismic Restraint Manual." Show analysis of supporting structure, anchorages, and restraints in accordance with OSSC Chapter 16 and reference ASCE standard. Seismic restraint system components shall be approved by the California Office of Statewide Health Planning and Development (OSHPD). Acceptable Manufacturers: Amber/Booth, Mason Industries, Tolco, or approved. Contractor shall submit calculations and shop drawings, sealed and signed by a Professional Engineer, showing seismic restraint design for all equipment, piping and ductwork required to be braced. **Seismic importance factor for new building is 1.5. For remodeled areas seismic importance factor is 1.0.**

### 3.07 PLUMBING SYSTEM IDENTIFICATION

- A. Piping System: Indicate each pipe system by its generic name (abbreviated) as shown/scheduled/specified; except vent and drainage piping. Comply with ANSI A13.1 for marker locations, letter sizes, and colors. Include arrows to show direction of flow and "Electric Traced" signs to identify heat cable wrapped piping. Locate pipe labels in accessible areas as follows:
  - 1. Near each valve, meter, gauge, or control device.
  - 2. Near equipment such as pumps, heat exchangers, water heaters, etc.
  - 3. At piping branch connections.
  - 4. At penetrations (each side) of walls, ceilings, and floors.
  - 5. At access panels and doors.
  - 6. At 25 foot maximum intervals. Provide a minimum of 1 label above each room where lift out ceiling is installed. Reduce intervals in congested areas such as mechanical rooms.
- B. Valve Identification: Tag all valves with brass disc and chain. Prepare valve charts indicating valve number, size, location, concealed or exposed, function, valve manufacture and model number, and normal position. Provide floor plan as part of record Drawings. Use no duplicate numbers in Plumbing and Heating systems. Mount glazed frames containing one set of valve charts in the building mechanical room.
  - 1. Include floor plan of each floor level with valve tag numbers indicated at approximate valve locations. Provide separate maps for plumbing valves and HVAC valves. Maps are to be 11"x17".
  - 2. Label all ceilings directly below or access panels directly in front of plumbing or HVAC valves using engraved, printed labels or hanging tags stating the valve ID as shown on the Valve Map and the Valve Tag Directory.
- C. Equipment: Provide engraved plastic-laminate signs at locations of major equipment such as heat exchangers, pumps, etc. Identify equipment in field same as on drawings. Permanently mount in an appropriate and effective location.
- D. Operation Tags: Where needed for proper and adequate information on operation and maintenance of mechanical systems, provide tags of plasticized card stock, either pre-printed or hand printed to convey the message; example: "DO NOT CLOSE THIS VALVE EXCEPT WHEN THE PUMP IS OFF."

### 3.08 EQUIPMENT CONNECTIONS

- A. Provide complete plumbing connections for all items of equipment requiring such connections, including incidental piping, fittings, trim and labor necessary for a finished working installation.
- B. Verify the rough-in and finish requirements for all equipment provided under other Divisions of the work and requiring plumbing connections with equipment supplier and installer prior to rough-in. Minimum branch pipe size for fixtures shall be 1/2".

### 3.09 PROTECTION

- A. Protect all work and materials against loss or damage. Close all pipe openings with caps or plugs. At final completion, thoroughly clean and deliver all work and equipment in an unblemished new condition. Keep all motors and bearings in watertight and dustproof covers during entire course of installation.
- B. Protect floors, walls, framing and sheathing where pipe cutting and threading operations are conducted with plastic sheeting under plywood sheets. Extend plastic sheeting beyond the plywood. Clean-up metal cuttings, oil, etc., daily or as necessary to prevent debris from being tracked beyond the protected area. Damages, as determined by the Architect, due to the pipe cutting/threading operation shall be repaired by the responsible trade.

### 3.10 CUTTING AND PATCHING

- A. General: Comply with the requirements of Division 1 for the cutting and patching of other work to accommodate the installation of mechanical work. Do all necessary cutting and patching of existing building and yard surfaces required for completion of the mechanical work. Patch to match finish and color of adjacent surfaces. Coordinate work in remodel and new areas to avoid cutting of new finished surfaces.

### 3.11 PIPE PENETRATION FIRE STOPPING

- A. Install as recommended by manufacturer and in accordance with the product's UL listing. Below are the minimum installation requirements.
  - 1. Install specified penetrating item(s) with required annular spacing in proper size wall or floor opening. Support penetrating item(s) adequately on both sides of construction.
  - 2. Clean all opening and penetrating item surfaces in penetration area to remove loose debris, dirt, oil, wax, grease, old caulking, etc.
  - 3. If needed or required for gypsum or concrete block walls, install specified galvanized steel wire mesh or sleeve recessed and centered inside wall around penetrating item(s) so that it is snug against perimeter of opening.
  - 4. When required, install specified type and depth of backing material in annular space, recessed to required fill depth of fire stopping caulking.
  - 5. Gun, trowel, and/or pump fire stopping sealant to specified depth in annular space around penetrating item(s). Trowel sealant surfaces flush with wall or floor surfaces to a smooth, defect-free finish. Where required, apply specified size caulking bead around penetrating item(s) at zero annular contact areas and tool smooth.
- B. Drawings show some, not all, of the penetration. Review architectural drawings for all fire walls.
- C. Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No. 1168.

### 3.12 ACOUSTIC SEALING/CAULKING

- A. See details on drawings. Seal all pipe penetrations of classrooms or auditorium.
- B. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No. 1168.
  - 1. Architectural Sealants: 250 g/L.
  - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
  - 3. Sealant Primers for Porous Substrates: 775 g/L.
- C. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
  - 1. Products:
    - a. Pecora Corporation; AC-20 FTR
    - b. Tremco Incorporated; Tremflex 834.
    - c. USG Corporation; SHEETROCK Acoustical Sealant.
- D. Joint Backing: Round, closed cell, non-gassing foam rod compatible with sealant; ASTM C 1330 Type B, cylindrical, bi-cellular material; oversized 30 to 50 percent larger than joint width.
  - 1. Products:
    - a. Sof Rod manufactured by Nomaco Inc.
    - b. Sonolastic Soft Backer-Rod manufactured by BASF.
- E. Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No. 1168.



### **3.13 MECHANICAL PAINTING**

- A. Minimum Requirements: All mechanical equipment, piping, insulation, etc., exposed in finished areas, storage rooms and other locations except mechanical equipment rooms will be painted per 09 9000.

### **3.14 PLUMBING WORK CLOSEOUT**

- A. General: Refer to the Division 1 sections for general closeout requirements. Calibrate all equipment requiring same. Complete each system as shown or specified herein and place in operation except where only roughing-in or partial systems are called for. Each system shall be tested and left in proper operation free of leaks, obstructions, or contamination.
- B. Record Drawings: Submit record set of drawings required in Division 1 as previously specified in this Section.
- C. Closeout Equipment/Systems Operations: Sequence operations properly so that work of project will not be damaged or endangered. Coordinate with seasonal requirements. Operate each item of equipment and each system in a test run of appropriate duration with the Architect present, and with the Owner's operating personnel present, to demonstrate sustained, satisfactory performance. Adjust and correct operations as required for proper performance. Clean and lubricate each system, and replace dirty filters, excessively worn parts and similar expendable items of the work.
- D. Operating Instructions: Conduct a walk-through instruction seminar for the Owner's personnel who are to be involved in the continued operation and maintenance of plumbing equipment and systems. Provide written instructions outlining and explaining the identification system, operational diagrams, emergency and alarm provisions, sequencing requirements, seasonal provisions, security, safety, efficiency and similar features of the systems.

**END OF SECTION**

BLANK PAGE

**SECTION 22-0700  
PLUMBING INSULATION**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

- A. The requirements of this section apply to the insulation of plumbing systems specified elsewhere in these specifications.
- B. The requirements of Section 22 0500, Common Plumbing Materials and Methods, also apply to this section.

**1.02 QUALITY ASSURANCE**

- A. Minimum Insulation Thickness and Thermal Performance: Comply with Oregon Energy Efficiency Specialty Code.
- B. Composite (Insulation, Jacket or Facing and Adhesives) Fire and Smoke Hazard Ratings: Not to exceed a flame spread of 25 or smoke development of 50 and containing less than 0.1% by weight deca-PDE fire retardant.
- C. Component Ratings of Accessories (Adhesives, Mastics, Cements, Tapes, Finishing Cloth for Fittings): Same as "B" requirements above and permanently treated. No water soluble treatments.

**1.03 SUBMITTALS**

- A. Submit catalog data and performance characteristics for each product specified.

**1.04 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. General: In addition to the requirements specified in Section 22 0500, the following apply:
  - 1. Deliver insulation, coverings, cements, adhesives and coatings to the site in factory-fabricated containers with the manufacturer's stamp or label affixed showing fire hazard ratings of the products. Store insulation in original wrappings and protect from weather and construction traffic.
  - 2. Protect insulation against dirt, water, chemical and mechanical damage. Do not install damaged insulation. Remove such insulation from project site.

**PART 2 PRODUCTS**

**2.01 ACCEPTABLE MANUFACTURERS**

- A. Insulation Manufacturers: Johns Manville, Owens-Corning, Knauf, Certain Teed, Armstrong, Pabco, Imcoa or Nomaco. Johns Manville products are listed unless indicated otherwise.
- B. Adhesive Manufacturers: Foster, 3M, Insul-Coustic, Borden, Kingco or Armstrong.

**2.02 PIPING INSULATION**

- A. Interior and Exterior Piping Systems 32 to 180 Deg. F: Glass fiber preformed pipe insulation with a minimum K-value of 0.23 at 75 deg. F, a minimum density of 3.5 pounds per cubic foot within all-service vapor barrier jacket, vinyl or pre-sized finish and pressure sensitive seal containing less than 0.1% by weight deca-PDE fire retardant.
- B. Pipe Temperatures Minus 30 to 180 Deg. F: Flexible, preformed, pre-slit, self-sealing elastomeric pipe insulation up to 2-1/8" ID, thermal conductivity of 0.27 BTU/hr. sq. ft./in. at 75 deg. F and vapor transmission rating of 0.2 perms/inch. On cold surfaces, apply in thickness necessary to prevent condensation on the surface at 85 deg. F and 70% RH. Armstrong "Armaflex 2000" or, in concealed locations, Imcoa or Nomaco also approved.

## 2.03 EQUIPMENT INSULATION

- A. Equipment Temperatures Below 70 Deg. F: Flexible, closed cell, elastomeric sheet insulation of 5.5 #/cubic feet density and 0.27 thermal conductivity at 75 deg. F. Armstrong "Armaflex."
- B. Equipment Temperatures From 70 to 450 Deg. F: Glass fiber 3 pound density insulation with a 0.23 thermal conductivity at 75 deg. F. Johns Manville "814 Spin-Glas" with "FSK" jacket containing less than 0.1% by weight deca-PDE fire retardant or finished as recommended by manufacturer.

## 2.04 INSULATION ACCESSORIES

- A. Insulation Compounds and Materials: Provide rivets, staples, bands, tapes, adhesives, cements, coatings, sealers, welded studs, etc., as recommended by the manufacturer for the insulation and conditions specified. No staples allowed on cold water piping systems.
- B. Interior Tanks and Equipment Insulation Covering: Finished metal jacket or as recommended by the manufacturer for insulation material specified.
- C. PVC Protective Jacketing and Valve and Pipe Fitting Covers: Johns Manville Zeston 2000, Proto LoSmoke, or Ceel-Co Ceel-Tite 100 Series with precut fitting fiberglass insulation or approved.
- D. Jacket Lap Sealing Adhesives: Foster Drion 85-75 contact cement or approved substitute.
- E. Saddles and Shields: Unless otherwise indicated and except as specified in piping system specification sections, install the following types:
  - 1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
  - 2. Protection Shields (MSS Type 40): Of length recommended by manufacturer to prevent crushing insulation.
  - 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe, 360-degree insert of high-density, 100-psi (690-kPa) minimum compressive strength, water-repellent-treated calcium silicate or cellular-glass pipe insulation, same thickness as adjoining insulation with vapor barrier and encased in 360-degree sheet metal shield.

## PART 3 EXECUTION

### 3.01 PIPING INSULATION

- A. General: Do not insulate underground piping except at joints and fittings on preinsulated piping unless indicated otherwise. At contractor's option and in accordance with Part 2 of this section, elastomeric insulation may be installed on domestic water piping in thicknesses equivalent to the glass fiber insulation. Installation shall comply with the manufacturer's recommendation with joints and seams completely sealed.
- B. Domestic Water Piping:
  - 1. Insulate with glass fiber pipe covering, 1" thick for cold water piping and for 1" and smaller hot water piping; 1-1/2" for 1-1/4" and larger hot water piping.
  - 2. Insulate hot water return piping same as cold water piping.
  - 3. Insulate all water piping exposed to outside weather and freezing temperatures with 1" thickness of glass fiber pipe covering with weather-proof metal jacket. Apply insulation after heat cable is installed.
- C. Pipe Fittings:
  - 1. Insulate and finish all fittings including valve bodies, bonnets, unions, flanges and expansion joints with precut fiberglass insulation and preformed PVC covers sealed to adjacent insulation jacket for continuous vapor barrier covering over all fittings.
  - 2. Provide removable/reusable insulation covers on 4" and larger valves, unions, flanges, pump casings, strainers and similar fittings or equipment requiring periodic service.
- D. Protective Covering: Install continuous protective PVC or metal covering on all piping and fittings in mechanical rooms, accessible tunnels, attic spaces, accessible ceilings, etc., where insulation may be subject to damage. Install with rivets or cement seams and joints.

- E. Insulated Piping: Comply with the following.
1. Attach clamps and spacers to piping.
    - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    - c. Do not exceed pipe stress limits according to ASME B31.9.
  2. Install MSS SP-58, Type 39 or Type 40 protection saddles, if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
    - a. Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN100) and larger if pipe is installed on rollers.
  3. Shield Dimensions for Pipe: Not less than the following.
    - a. NPS 1/4 to NPS 3-1/2 (DN8 to DN90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
    - b. NPS 4 (DN100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.
    - c. NPS 5 and NPS 6 (DN125 and DN150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.
    - d. NPS 8 and NPS 14 (DN200 and DN350): 24 inches (610 mm) long and 0.075 inch (1.91 mm) thick.
    - e. NPS 16 and NPS 24 (DN400 and DN600): 24 inches (610 mm) long and 0.105 inch (2.67 mm) thick.
  4. Pipes NPS 8 (DN200) and Larger: Include wood inserts.
  5. Insert Material: Length at least as long as protective shield.
  6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.
- F. Piping Insulation Lap Seams and Butt Joints: Install insulation jacket in accordance with manufacturer's recommendation and without staples on cold water lines. Where jacket joint and lap seams have not adhered, remove affected section of insulation and reinstall or apply lap sealing adhesive in accordance with manufacturer's instructions.

**END OF SECTION**

BLANK PAGE

**SECTION 22-1000  
PLUMBING PIPING AND PUMPS**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

- A. Provide pipe, pipe fittings, piping specialties, pumps and related items required for complete piping system.
- B. Related Work: The requirements of Section 22 0500, Common Plumbing Materials and Methods, also apply to this section.

**1.02 QUALITY ASSURANCE**

- A. General: ASTM, and ANSI Standards are indicated. In addition, special standards are referenced where neither ASTM nor ANSI Standards are applicable.
- B. Labeling: All piping shall be continuously and legibly labeled on each length as required by codes and standards and including as a minimum, country of origin, manufacturer's identification marking, wall thickness designation, and applicable standards and approvals. Fittings shall be labeled as required by the referenced standard. Tubular fixture traps shall be stamped with manufacturer's mark and material thickness.
- C. Potable Water Valves: Potable water piping materials not limited to faucets, mixing valves, or pressure reducing valves. Valves shall meet NSF Standard 61, Section 9, for drinking water faucets and shall be brass construction. Brass components which contact water within the faucet shall be from brass which contains no more than 3 percent lead by dry weight.
- D. Concealed Plastic Piping: No concealed plastic piping inside the building unless approved by Code or Governing Authorities.
- E. Definitions: Where piping fluid is not indicated in the following paragraphs, provide similar piping materials for similar fluids (i.e., "make-up water" = "domestic water"; "wet stand pipe" = "fire sprinkler pipe"; "drainage piping" = "sanitary/storm sewer piping").
- F. Plumbing System Disinfection shall be performed by an experienced, qualified, chemical treatment agency.

**1.03 STORAGE AND HANDLING**

- A. Provide factory-applied end caps on each length of pipe and tube. Maintain end caps through shipping, storage and handling as required to prevent pipe-end damage and eliminate dirt and moisture from inside of pipe and tube. Protect flanges and fittings from moisture and dirt by inside storage and enclosure, or by packaging with durable, waterproof wrapping.

**1.04 SUBMITTALS**

- A. Submit catalog data for each product specified.

**PART 2 PRODUCTS**

**2.01 PIPING MATERIALS**

- A. Copper Pipe and Tube:
  - 1. Application:
    - a. Domestic water.
    - b. Priming lines.
    - c. Pressure sewer.
  - 2. Pipe: ASTM B88. Produced by American manufacturer only. Foreign produced piping is not allowed.
    - a. Above Ground Domestic Water: Type L hard temper copper with soldered joints.

- b. Underground Domestic Water and Priming Lines: Type L soft annealed with no joints or type K hard tempered copper with silver soldered joints.
    - 3. Fittings: Wrought copper solder-joint fittings, ANSI / ASME B16.22.
    - 4. Preinsulated Piping: Type K solder joint copper piping with 1" thick urethane insulation protected by 20 gauge PVC outer jacket. Rovanco "Insul/80," equivalent Rikwil or approved substitute.
    - 5. Domestic Water, 2-1/2" and Larger: Rolled groove gasketed mechanical fittings with UPC approval. Tyco-Grinnell CTS or Victaulic CTS, NIBCO Press System or approved.
    - 6. Domestic Water up to 4": UPC approved mechanically compressed copper or bronze fittings with EPDM O-ring seal. Viega ProPress, Mueller approved.
      - a. Manufacturers subject to compliance with requirements, provide products by one of the following:
        - 1) CopperPress® by Merit Brass
        - 2) ViegaPro Press
        - 3) Mueller
        - 4) Or Approved
      - b. Fittings for NPS 2 (DN 50) and Smaller: Wrought-copper fitting with EPDM-rubber, O-ring seal in each end.
      - c. Fittings for NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Cast-bronze or wrought-copper fitting with EPDM-rubber, O-ring seal in each end.
      - d. CopperPress® fittings are designed to be used with ASTM B88 Type K, L and M 1/2" – 4" copper tubing in the hard-drawn condition and soft copper tubing in sizes 1/2" to 1 1/4".
      - e. Fittings shall have a mechanism to ensure they have been pressed consisting of one or more of the following:
        - 1) Leak before press sealing element function.
        - 2) Visual indication band which can be removed once the Press has occurred.
- B. Cast Iron DWV Pipe:
- 1. Application: 1-1/2" and larger.
    - a. Sanitary waste
    - b. Plumbing vent
    - c. Rain drain
  - 2. Pipe: Hubless cast iron soil pipe, CISPI 301-05/ASTM A 888-05. Produced by American manufacturer only. Foreign produced piping is not allowed.
  - 3. Fittings: Hubless cast iron fittings: CISPI 301-05/ASTM A 888-05.
  - 4. Couplings:
    - a. Standard Duty: No-hub couplings meeting CISPI 310 and incorporating ASTM C 564 gasket, type 301 SS corrugated shield and type 301 SS clamping bands. Two clamping bands on 1-1/2" thru 4" pipe and four bands on 6" thru 10" pipe.
    - b. Heavy Duty: No-hub couplings meeting ASTM C 1540, and FM 1680. ASTM C 564 neoprene gasket, type 304 SS corrugated shield and type 304 SS clamping bands. Four bands on 1-1/2" thru 4" pipe and 6 bands on 5" thru 10" pipe.
    - c. Couplings to Dissimilar Pipe in Concealed Locations: Fernco "ProFlex" with stainless steel collar or approved substitute.
  - 5. Manufacturers: Cast iron pipe and fittings – AB&I, Charlotte Pipe, Tyler Pipe, or approved. All pipe shall be labeled by the manufacturer.
- C. Plastic Pipe – Drain, Waste, Vent (DWV):
- 1. Application:
    - a. Sanitary waste below slab only; unless noted otherwise. Not allowed for grease waste.
    - b. Plumbing vent where concealed.
    - c. Rain drain below slab only.
    - d. Roof overflow drain piping above grade. (Not allowed above grade for rain drain).
  - 2. Pipe:
    - a. Poly(vinyl chloride) (ASTM D1784) (PVC) solid core plastic drain, waste and vent pipe (ASTM D2665 and D1785) and fittings (ASTM D2665) (DWV).
    - b. Acrylonitrile-butadiene-styrene (ABS) (ASTM D3965) plastic drain, waste and vent piping (ASTM F628) and fittings (ASTM D2661) (DWV). (Only when used on slopes of 2% or greater and for below grade piping).



3. Fittings: Provide fittings of the type indicated, matching piping manufacture. Where not otherwise indicated, provide fittings produced and recommended for the service indicated by the piping manufacturer.
- D. Plastic Pipe:
1. Application:
    - a. Below grade domestic water.
    - b. Above grade domestic water when continuously supported per specification and concealed.
    - c. Priming lines if covered and protected from damage and light.
  2. Pipe:
    - a. Cross-linked polyethylene (PEX) tubing manufactured by PEX-a or Engel Method for Water Service: Tested/listed to ASTM E84, ASTM F876 and F877, and CSA B137.5 listed certified to NSF standards 14 and 61. Rated for 100 PSI at 180° F. UPONOR, AQUAPEX or approved.
  3. Fittings: ASTM F1960 cold expansion fittings. Provide fittings of the type matching piping manufacture and recommended by the piping manufacturer for the service indicated.

## 2.02 MISCELLANEOUS PIPING MATERIALS

- A. Insulating (Dielectric) Fittings: Do not use, see Section 3.3, D.
- B. Soldering and Brazing Materials: Provide soldering materials as determined by the installer to comply with installation requirements.
  1. Tin-Antimony Solder: ASTM B32, Grade 95TA.
  2. Lead-Free Solder: ASTM B32, Grade HB. Harris "Bridgit" approved.
  3. Silver Solder: ASTM B32, Grade 96.5TS.
  4. Flux: Water soluble paste flux.
  5. Brazing filler rod: BCuP rod to suit conditions.
- C. Sleeve Seal: Rubber-link pipe wall and casing closure. Thunderline Link-Seal. For fire rated wall, floor or ceiling penetrations, 3-M "CP-25" caulk, "No. 303" putty and/or "PSS 7904" sealing system.
- D. Strainers: "Y-pattern," iron or bronze body rated for pressures indicated with blow-off connection and 20 mesh stainless steel screen.

## 2.03 PIPING SPECIALTIES

- A. Cleanouts:
  1. Manufacturer: Jay R. Smith, Zurn, Wade, Watts, Josam, Mifab, or approved substitute.
  2. Types:
    - a. Tile Floor Cleanouts: Smith 4053-U with square heavy-duty nickel bronze top, bronze plug, and vandalproof screws. Adjustable top where cast into floor slab.
    - b. Carpeted Floor Cleanout: Smith 4023-U-X with round heavy-duty nickel bronze top, bronze plug, carpet clamping device, and vandalproof screws. Adjustable top where cast into floor slab.
    - c. Concrete Floor Cleanout: Smith 4023 with round heavy-duty nickel bronze top. Stainless steel shallow cover and vandalproof screws. Adjustable top where cast into floor slab.
    - d. Wall Cleanouts: Smith 4472-U, bronze ferrule with raised head bronze plug, stainless steel shallow cover and vandalproof screws.
    - e. Outside Area Walks and Drives: Smith 4253-U-G with galvanized cast iron body, top secured with vandalproof screws, and bronze plug. Install in 18" x 18" x 6" deep concrete pad flush with grade.
    - f. Second Floor Clean-outs: Mifab C1100-RFC clean out with surface membrane clamp.
- B. Drains:
  1. Zurn, Jay R. Smith, Josam, Watts, Wade and Mifab are approved. Numbers scheduled on drawings represent minimum acceptable standard for locations involved. Where CECO is listed previously listed manufactures are approved.

2. Cast iron construction with acid resistant coating, anchor flange, and other options as indicated by model number.
  3. Install 4 pound sheet lead flashing, extending not less than 10" from and clamped to all drains not completely cast-in-place in a homogeneous material.
- C. Flashing: Minimum 4# sheet lead; to extend horizontally 10" from edge of vent penetrations or rain drain body and vertically 12" minimum up from roof turned over and down into hub of vent or finished with bronze cap providing counterflashing for screwed pipe.
- D. Shock Arrester: Precharged bellows or sealed piston type manufactured to meet PDI WH-201 and ASSE 1010 Standards. Size in accordance with PDI procedures. Jay R. Smith, PPP, Sioux Chief, Wade, Zurn, Watts, Josam, or approved substitute.
- E. Priming Valves:
1. Electrically operated priming station with header sized for number of outlets required. Provide with 120v power supply, timer, and solenoid valve tested per UL. Provide with IAPMO approved atmospheric vacuum breaker. Provide in recessed wall box with access door per Section 22 0500. P.P.P. Inc., PT Series or approved.
  2. Flow operated valves Jay R. Smith 2699 only. Locate in closets, under counters or in walls behind access panels as specified in Section 22 0500.
  3. McIntosh Primes: Manufactured for connection to flush valve to be with gasket chrome supply line and wall escutcheon.
  4. Use copper or PEX specified previously for all underground priming lines.
- F. Traps: Except chrome plated fixture traps. Recessed drainage pattern for threaded pipe and same grade as pipe for cast iron and plastic pipe; with cleanout plugs in trap body in all above grade locations.
- G. Pressure Reducing Valve: Single seat type with renewable stainless steel seat and valve. Size and capacity as shown on Drawings. Bronze bodies with screwed connections on valves 2-1/2" and smaller and flanged steel bodies on valves 3" and larger. Install each PRV with strainer on inlet or internal strainer. Leslie, Watts, Cash-Acme, Zurn-Wilkins, or approved substitute.
- H. Backflow Preventer: Where indicated on the Drawings, install a reduced pressure backflow preventer complete with shutoff valves, two separate check valves, differential relief valve, and test cocks. USC Foundation for Cross Connection Control, State Health Officials, and serving utility approved. Bronze bodies on units 2" and smaller, and cast iron bodies with bronze trim on units 2-1/2" and larger.
- I. Backflow Preventer: Where indicated on the Drawings, install a double check backflow preventer complete with shutoff valves, two separate check valves, and test cocks. USC Foundation for Cross Connection Control, State Health Officials, and serving utility approved. Bronze bodies on units 2" and smaller, and cast iron bodies with bronze trim on units 2-1/2" and larger.
- J. Domestic Water Balancing Valve: Lead free brass or bronze body or 300 Series stainless steel body with stainless steel trim. Victaulic TA Series 76X or approved substitute.

#### **2.04 PUMPS**

- A. Domestic Hot Water Circulator: Stainless steel body and lead free design in-line circulator with sleeve bearing. Provide with 3 speed switch to allow balancing to actual needs. Grundfos UP Series or equal Bell & Gossett, Peerless, or Armstrong. Provide with 7-day programmable electronic time clock and aquastat to start and stop the pump.
- B. Elevator Sump Pump: Submersible, 50 gpm at 25 ft. head, minimum 1/2 horsepower sump pump with integral float switch. Myers, Paco, Hydronix, Zoeller, Viking, Liberty, or approved.

#### **2.05 MASTER MIXING VALVE**

- A. Mixing valve station shall be fully factory assembled and tested and shall include 2 mixing valves.

- B. Master Mixing Valve(s) of all lead free brass body with paraffin based thermostatic master control element to fail safe upon cold water or control element failure. Valve shall be ASSE 1017 listed for minimum and maximum flows schedule. Valve shall include Type L copper tube with solder fittings, isolation ball valves on all inlet and outlet connections, check valves on inlet lines with pressure gauges. Provide with strainers on inlets, and dial thermometer(s) on outlet. Valve location, arrangement and capacity as shown on plans.
- C. Manufacturers: Powers LF MM43XHL Series or equal Leonard, Bradley, Lawler, Acorn, or Symmons.

**2.06 BACKFILL MATERIALS**

- A. Subbase Materials: A graded mixture of gravel, sand, crushed stone or crushed slag.
- B. Finely-Graded Subbase Material: Well graded sand, gravel, crushed stone or crushed slag, with 100% passing a 3/8" sieve.
- C. Backfill Material: Soil material suitable for compacting to the required densities, and complying with AASHTO designation M145, Group A-1, A-2-4, A-2-5, or A-3.
- D. Stabilization Fabric: Nonwoven stabilization and drainage fabric. Mirafi 140S or 140M.

**PART 3 EXECUTION**

**3.01 UTILITY SERVICE**

- A. Plumbing Utility Connections: Complete installation. Contact local serving utilities to determine conditions involved and make or arrange to have connection made at proper time and pay all costs involved.
- B. Sanitary and Storm Sewers: Connect sanitary and storm sewers as shown on the Drawings and as required by the serving utility. Verify depth, size and location prior to installation of the new sewer systems.
- C. Water Service: Connect to water system.

**3.02 PIPE INSTALLATION**

- A. General: Install pipe, tube and fittings in accordance with recognized industry practices and plumbing code standards. Install each run accurately aligned with a minimum of joints and couplings, but with adequate and accessible unions and flanges for disassembly, maintenance and/or replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings.
- B. Piping Runs: Route piping close to and parallel with walls, overhead construction, columns and other structural and permanent-enclosure elements of the building. Install piping plumb and level except where pitched for drainage. If not otherwise indicated, run piping in the shortest route which does not obstruct usable space or block access for servicing the building or equipment and avoid diagonal runs. Wherever possible in finished and occupied spaces, conceal piping from view. Do not encase horizontal runs in solid (concrete or CMU) partitions.
- C. Ensure all copper piping is protected from contact with non-copper and plated supports. Provide strut cushion below clamp or 2 layers of UPC listed 10 mil tape.

**3.03 PIPING JOINTS**

- A. General: Provide joints of the type indicated in each piping system, and where piping and joint as manufactured form a system, utilize only that manufacturer's material.
- B. Cast Iron "No-Hub": All joints in accordance with the Cast Iron Soil Pipe Institute (CISPI) Designation No. 310-97 "Installation Procedures for Hubless Cast Iron Soil Pipe and Fittings For Sanitary and Storm Drain, Waste and Vent Piping Applications." Horizontal runs of 5" and greater shall be braced as indicated in Figure 4 for "rodding" restraints. Application of couplings as follows:

1. Standard Duty Couplings: All vent piping and all drainage and waste piping above grade.
  2. Heavy Duty Couplings: All underground waste installations and any storm drain installations 2 stories or more in height.
- C. Solder Copper Tube and Fitting Joints: In accordance ANSI B 828 with recognized industry practice. Cut tube ends squarely. Copper tubing shall be cut with a wheeled tubing cutter or approved copper tubing cutting tool. The tubing shall be cut square to permit proper joining with the fittings. Remove scale, slag, dirt and debris from inside and outside of tubing and fittings before assembly. The tubing end shall be wiped clean and dry. The burrs on the tubing shall be reamed with a deburring or reaming tool. Apply solder flux to joint areas of both tubes and fittings. Insert tube full depth into fitting, and solder in a manner which will draw solder full depth and circumference of joint. Wipe excess solder from joint before it hardens. "T-Drill" field formed tees may be utilized where the main is at least two pipe sizes larger than the branch.
- D. Insulating (Dielectric) Fittings: Where the "joining of ferrous and non-ferrous piping", use brass valve or brass nipple with length/nominal diameter ratio of 8 or greater rather than dielectric fitting.
- E. Changes in Direction: Use fittings for all changes in direction. Run lines parallel with building surfaces.
- F. Line Grades:
1. Drainage Lines: Run at maximum possible grade and in no case less than 1/4" per foot within building.
  2. Vents: Pitch for drainage 1/4" per 10'.
  3. Water: Pitch to low points and install hose bib drains. 3' minimum depth of ground cover for all lines outside building unless otherwise noted.
- G. Unions and Flanges: At all equipment to permit dismantling and elsewhere as consistent with good installation practice.
- H. Expansion: Provide loops, swing joints, anchors, runouts and spring pieces to prevent damage to piping or equipment.
- I. Plastic Pipe/Tube Joints: Comply with manufacturer's instructions and recommendations, and with applicable industry standards:
1. Heat Joining of Thermoplastic Pipe: ASTM D-2657.
  2. Making Solvent-Cemented Joints: ASTM D-2865 and ASTM F-402.
- J. Braze Copper Tube and Fitting Joints: Where indicated. Pass a slow stream of dry nitrogen gas through the tubing at all times while brazing to eliminate formation of copper oxide.
- K. Grooved Pipe Joints: Comply with fitting manufacturer's instructions for making grooves in pipe ends. Remove burrs and ream pipe ends. Assemble joints in accordance with manufacturer's instructions. Visually inspect the assembled joint to ensure proper gasket seating.

### **3.04 CLEANOUTS**

- A. Where required by code, at each change of sewer direction 45 degrees or greater and more than 10' long, at end of each branch or main and spaced not greater than 100' apart, as required by code and/or as shown on Drawings.

### **3.05 MISCELLANEOUS PIPING EQUIPMENT**

- A. Floor, Wall and Ceiling Plates: Chrome plated pressed steel or brass screw locked split plates on all pipe penetrations in finished spaces.
- B. Strainers: Install in a manner to permit access for cleaning and screen removal and with blow-off valve.

- C. Sleeves: At all penetrations of concrete or masonry construction. PVC, 24 gauge galvanized steel or Schedule 40 galvanized steel pipe. Use steel pipe sleeves through beams, footings, girders or columns and for all penetrations of walls or floors below grade. Where floor finish is ceramic tile, terrazzo, or similar material extend standard steel pipe sleeves 1-1/2" above finished floor. Fabricate sleeves 1" diameter larger than pipe or insulation. PVC and sheet metal sleeves at non-structural penetrations only.
- D. Sleeve Caulking: Caulk below grade pipe with rubber link seal. Grout above grade pipe with cement mortar or approved waterproof mastic. All caulking or grouting shall extend full depth of sleeve. Utilize rubber sealing links in lieu of caulking. Install UL sealing caulk, putty and/or system at all penetrations of fire rated walls, floors and ceiling.
- E. Shock Arrestors: Install at end of mains, in a battery of three or more flush valve-operated fixtures water header, ahead of quick closing and solenoid operated valves. Size per PDI recommendations where size is not indicated. Provide access panels.
- F. Trap Priming: Traps serving floor drains, floor sinks, catch basins, and similar fixtures shall be primed in accordance with Code requirements.
- G. See Section 23 0500 for Pump Starters.

### 3.06 EXCAVATING

- A. General: Do not excavate for mechanical work until the work is ready to proceed without delay, to minimize the total time lapse from excavation to completion of backfilling. Comply with all applicable Federal and state safety regulations and local erosion control requirements.
- B. Width: Excavate for piping with 6" to 9" clearance on both sides of pipe, except where otherwise shown or required for proper installation of pipe joints, fittings, valves and other work. Excavate for other work to provide minimum practical but adequate working clearances.
- C. Depth for Direct Support: For work to be supported directly on undisturbed soil, do not excavate beyond indicated depths, and hand-excavate the bottom cut to accurate elevations. Support the following work on undisturbed soil at the bottom of the excavations:
  1. Piping of 5" and less pipe/tube size.
  2. Cast-in-place concrete.

### 3.07 BASE PREPARATION

- A. Subbase Installation: Where indicated, install subbase material to receive mechanical work, and compact by tamping to form a firm base for the work. For 4" and larger piping, horizontal cylindrical tanks and similar work, shape the subbase to fit the bottom 90 degrees of the cylinder, for uniform continuous support. Provide finely-graded subbase material for wrapped, coated and plastic pipe and tank. Shape subbases and bottoms of excavation with recesses to receive pipe bells, flanged connections, valves and similar enlargements in the piping systems and set bottom of trench at proper pitch and correct elevations with subbase material.
- B. Previous Excavations: Where piping crosses over an area more than 5' wide which has been previously excavated to a greater depth than required for the piping installation, provide suitable subsidence-proof support for the piping. Comply with the details shown, or where not otherwise shown, provide the following support system:
  1. Excavate to undisturbed soil, in a width equal to the pipe diameter plus 2'. Install 8" courses of subbase material, each compacted to 95% of maximum density, as required to fill excavation and support piping.

### 3.08 BACKFILLING

- A. Do not backfill until installed mechanical work has been tested and accepted wherever testing is indicated. Install drainage fill where indicated, and tamp to a uniform firm density. Backfill with finely-graded subbase material to 6" above wrapped, coated and plastic piping and tanks, and to center line of other tanks (where recommended by tank manufacturer, use "pea gravel" backfill). Condition backfill material by either drying or adding water uniformly, to whatever extent may be necessary to facilitate compaction to the required densities. Do not backfill with frozen materials.

### 3.09 CLEANING

- A. General: Clean all dirt and construction dust and debris from all mechanical piping systems and leave in a new condition. Touch up paint where necessary.
- B. Disinfection of Domestic Water Piping System:
  - 1. Prior to starting work, verify system is complete and clean.
  - 2. Open all drains and fixtures valves in the building starting with the valve nearest the water service line and permit the water to run clear for 10 minutes to eliminate grease, cuttings, flux, and foreign matter.
  - 3. Inject disinfectant at beginning of water system to be disinfected. Introduce free chlorine in liquid form, throughout system to obtain concentration required by local Public Health Department regulations or 50 to 80 mg/L residual.
  - 4. Bleed water from all potable water outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
  - 5. Maintain disinfectant in system for 24 hours.
  - 6. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
  - 7. Flush disinfectant from system until residual is equal to that of incoming water or 1.0 mg/L.
  - 8. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C601. If any sample fails the analysis, repeat the procedure.
  - 9. Include a copy of the bacteriological analysis in the Operating and Maintenance manuals.
  - 10. If allowed by local jurisdiction, testing is acceptable in lieu of treatment.
- C. Sanitary and Storm Drainage System:
  - 1. Remove construction debris from cleanouts, drains, strainers, baskets, traps, etc., and leave same accessible and operable. Place plugs in the end of uncompleted piping at the end of the day or whenever work stops.
  - 2. Before final acceptance of completed sewer system, flush and clean the entire system with water. Trap and remove solid material obtained from flushing and cleaning from the new system. Do not allow debris to enter the existing sewer system.

### 3.10 TEST

- A. General:
  - 1. Minimum duration of two hours or longer, as directed for all tests. Furnish report of test observation signed by qualified inspector. Make all tests before applying insulation, backfilling, or otherwise concealing piping or connecting fixtures or equipment. Where part of the system must be tested to avoid concealment before the entire system is complete, test that portion separately, same as for entire system.
  - 2. Provide all necessary temporary equipment for testing, including pump and gauges. Remove control devices before testing and do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating. Fill each section with water and pressurize for the indicated pressure and time.
  - 3. Observe each test section for leakage at end of test period. Test fails if leakage is observed or if pressure drop exceeds 5% of test pressure.
- B. Repair:
  - 1. Repair piping system sections which fail the required piping test by disassembly and re-installation, using new materials to the extent required to overcome leakage. Do not use chemical stop-leak compounds, solder, mastics, or other temporary repair methods.
  - 2. Drain test water from piping systems after testing and repair work has been completed.
- C. Sewer: Furnish all facilities and personnel for conducting the test. Test in accordance with the requirements of the State Plumbing Inspector and local authorities.
- D. Plumbing Waste and Vent Piping: Hydrostatic test by filling to highest point, but not less than 10' water column on major horizontal portion.
- E. Water Piping: Hydrostatic pressure of 100 psig without loss for four hours.

- F. Tanks and Equipment: Hydrostatic pressure to 1.5 times operating pressure but do not exceed maximum rated pressure.

### **3.11 SUPERVISION AND START-UP**

- A. Adjust flush valves, pressure reducing valves, water heater thermostats, and similar equipment.
- B. Master mixing valve start-up procedure: Provide a factory authorized representative to review the installation of the mixing valve and verify that the adjustment has been completed by an authorized agent of the manufacture. Provide documentation in the O&M documents showing adjustment has been completed per manufacture instructions. Record supply and return temperatures. Work shall be completed prior to substantial completion.

**END OF SECTION**

BLANK PAGE



**SECTION 22-3000  
PLUMBING EQUIPMENT**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

- A. The requirements of this section apply to the plumbing equipment.
- B. Provide plumbing equipment specified and shown on the Drawings.
- C. Related Work: The requirements of Section 22 0500, Common Plumbing Materials and Methods, also apply to this section.

**1.02 QUALITY ASSURANCE**

- A. Code: Comply with requirements of the Oregon State Plumbing Specialty Code.
- B. All equipment and component parts shall conform to governing codes. Gas-fired equipment shall be design certified by AGA.
- C. Labeling: All equipment shall have permanent labels affixed by the manufacturer listing model number, capacity, efficiency, approvals, and similar characteristics of the product.

**PART 2 PRODUCTS**

**2.01 PIPING**

- A. Piping, fittings, pumps, and related items are specified in Section 22 1000.

**2.02 WATER HEATERS**

- A. Light Commercial Electric Storage Water Heater:
  - 1. UL approved and complying with the State Energy Code. Unit shall be tested to Department of Energy 10 CRE Part 430 and compliant with OEESC 504.2. Provide adjustable automatic thermostatically controlled electric insertion elements constructed to withstand 400 degrees F without failure. Heavy glass-lined steel tank with magnesium anode, heat traps, not less than 2" of non-organic insulation or non-CFC foam insulation and factory enameled jacket. Install with ASME Code pressure-temperature relief valve and brass hose bib drain. Capacity as shown on Drawings.
  - 2. Manufacturers: Bock, Bradford White, A.O. Smith, or approved substitute.

**2.03 WATER HEATER SYSTEM DEVICES**

- A. Water Heater and Tank Seismic Restraints: For water heaters and tanks, Spacemaker, Holdrite "Quickstrap," or approved.
- B. Domestic Hot Water Expansion Tank: Plastic lined drawn steel tank for potable water with epoxy exterior finish, air charging valve and system piping connection. Butyl rubber diaphragm with steel retaining ring. Base mounting ring on sizes over 5 gallons. ASME construction on sizes over 10 gallons. Provide with relief valve where working pressure rating is less than 150 psi.

**PART 3 EXECUTION**

**3.01 UTILITY SERVICE**

- A. Plumbing Utility Connections: Complete installation. Verify rough in dimensions of equipment prior to installing piping.

### **3.02 EQUIPMENT INSTALLATION AND CONNECTION**

- A. All equipment shall be installed plumb and level unless otherwise recommended by the manufacturer.
- B. Arrange piping connections to equipment to allow removal and replacement of the equipment without disassembly of connecting piping. Provide valves, unions, flanges, etc. at connection points.
- C. Arrange equipment for adequate service access as recommended by the manufacturer and as required by code.
- D. Anchor equipment to resist displacement due to seismic events as detailed on the drawings, recommended by the manufacturer, and as required by code and as specified in other sections of these specifications. Provide seismic straps as specified above for tank type water heaters.
- E. Install drain pans under all water heaters as specified in Section 22 0500.

### **3.03 EQUIPMENT CLEANING**

- A. Remove construction and shipping protection and thoroughly clean all plumbing equipment just prior to building acceptance.

### **3.04 SUPERVISION AND START-UP**

- A. Do not place equipment onto operation until required work of other trades is complete, e.g. venting systems, combustion air ducts, etc.
- B. Follow manufacturer's instructions for start-up and adjustment of equipment.

**END OF SECTION**

**SECTION 22-4000**  
**PLUMBING FIXTURES**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

- A. The requirements of this section apply to the plumbing fixtures and trim.
- B. Provide fixtures as shown on the Drawings and specified herein. Provide all required fixture trim and accessories for a complete, finished installation.
- C. Related Work: The requirements of Section 22 0500, Common Plumbing Materials and Methods, also apply to this section.

**1.02 QUALITY ASSURANCE**

- A. Code: Comply with requirements of the Oregon State Plumbing Specialty Code.
- B. Fixture color: White unless indicated otherwise.
- C. Potable Water Valves: Potable water valves not limited to faucets, mixing valves, or pressure reducing valves. Valves shall meet NSF Standard 61, Section 9, for drinking water faucets and shall be brass construction. Brass components which contact water within the faucet shall be from brass which contains no more than 3 percent lead by dry weight.

**PART 2 PRODUCTS**

**2.01 PIPING**

- A. Piping, fittings, and related items as specified in related Sections 22 1000.

**2.02 INTERIOR PLUMBING MATERIALS**

- A. Dishwasher and Cooking Equipment Pressure Reducing Valve: For installation with dishwasher booster heater and other kitchen equipment, all brass lead free certified, single seat type for dead end service, with renewable stainless steel seat and valve. Designed for service on hot water to reduce pressure from 50 psi to 20 psi. Watts, Cash-Acme, Zurn-Wilkins, or approved substitute.
- B. Single Fixture Tempering Valve: Lead Free Certified, Thermostatic mixing valve. ASSE 1070 listed. Cast copper silicon alloy construction with stainless steel disc and springs, copper thermostat. Watts LFMMV, Acorn ST7069 approved.

**2.03 PLUMBING FIXTURES AND TRIM**

- A. Stops: Furnish stop valves for all fixtures. Loose key style, in wall, angle or straight through pattern to fit installation. Stops to be lead free certified all brass with full turn brass stem and replaceable washer, no plastic. Compression nuts to be high copper content brass. Finish to be copper nickel chrome plate. Product to carry manufacturer's name. Risers to be chrome plated copper. Provide chrome plated shallow escutcheons. McGuire, Chicago, Brasskraft, Keeney, Zurn, or approved substitute.
- B. Fixture Traps: Exposed fixture tailpieces, traps, and wastes shall be chrome plated 17 gauge seamless brass tube with cast brass nuts and deep or box style escutcheons as required to conceal rough piping. Products to be stamped with manufacturer's name and material gauge. McGuire, Keeney, Zurn, or approved.
- C. Provide compliant fixture piping protector kit on all exposed accessible fixture traps and water supplies. White anti-microbial molded PVC. IPS Truebro "Lav Guard 2", McGuire "ProWrap", Plumberex "Pro-extreme", or approved substitute.

- D. Water Closet, Flush Valve, Vitreous China: Elongated water closet bowl shall be designed for 1.28 gallon siphon jet flushing action.
1. Install each listed water closet with the following:
    - a. Flush Valve: Quiet acting, exposed chrome plated brass with ADA metal oscillating non-hold-open handle, screwdriver check/control stop with vandal resistant cap, cast wall flange, synthetic rubber diaphragm, and vacuum breaker, as recommended by closet manufacturer. Sloan only.
    - b. Seat: Solid white heavy weight molded plastic seat, with molded in bumpers; open front less cover for elongated bowl with check and self-sustaining hinge. Hinge and hardware to be 300 Series stainless steel. Church 295-SSC, Beneke 523-SS/CH-B, or Bemis 1955 SS/C, Zurn Z5956SS-EL-ST5.
  2. Floor Mount "WC-1": Top Spud, ADA height. American Standard 3043.001.020 or equal Kohler.
- E. Lavatory, Vitreous China:
1. Faucet: Chrome plated brass body with single lever handle for the handicapped, vandal resistant 0.5 gpm aerator, ASSE 1070 certified with grid strainer waste. Chicago 420-T or equal Delta Commercial, American Standard or approved.
  2. Wall Hung, 20" x 18" Size: Provide with concealed arm hangers and wall backing plate (Jay R. Smith, Josam, Wade, Watts, or Zurn). American Standard 0355.012 or Kohler K-2005.
- F. Service Sump (Mop Basin) "SS-1":
1. Faucet exposed, brass body, rough plated, long spout, top brace, hose end spout with bucket hook, vacuum breaker and integral stops in shanks. Chicago 897-RCF or equal T & S, mounted 24" above rim. Install with 18 gauge type 302, No. 4 finish stainless steel splash on the two walls.
  2. Molded stone 24" x 24" x 10" deep with vinyl bumper guard and 3" brass body strainer outlet. Fiat, Mustee, Swan or approved substitute.
- G. Stainless Steel Sinks: Type 302 or 304 (unless noted otherwise), 18 gauge, self-rimming stainless steel sink, fully undercoated, drawn bowl with satin finish. Elkay numbers are listed; Just is approved. Install with stainless steel crumb cup strainer outlet or grid strainer (as noted), flange tail piece, and 1-1/2" trap. For faucets, Chicago numbers are listed, American Standard or Delta Commercial approved. Sinks shall be punched for faucet specified. Coordinate number of holes required. Cock hole covers are not allowed. Provide with tail piece as required for dishwasher or AC condensate drain per drawings.

Location	Tag	Basin (Elkay)	Faucet (Chicago)	ADA	Strainer, Disposal, etc.
Staff Break Room	S-1	Single Compartment DRKAD2217 with 6 1/2" depth.	786 Series, 8" projection gooseneck with 1.5 GPM vandal resistant aerator, ADA 369 handles.	Yes	See note # 1. Provide with In-Sink Aerator Evolution Series Disposal. Crumb cup strainer.

Note #1: Provide 16 GA S.S. re-enforcement plate below sink and faucet securing nuts. See detail on Drawings. 6/P6.01

- H. Refrigerator Water Connection, RC-1: Guy Gray BIM 875 or approved.
- I. Hose Bibs:

**PART 3 EXECUTION**

**3.01 PIPING**

- A. Install in accordance with Section 22 1000.

### **3.02 FIXTURE INSTALLATION AND CONNECTION**

- A. All exposed fixture hardware and piping shall be plated with polished chrome unless otherwise directed in these specifications. Where chair carriers or special carrier design are not indicated, provide 3/16" thick by 6" wide steel to waste or vent piping and to available building construction.
- B. All fixtures in contact with finished walls and floors shall be caulked with waterproof, white, non-hardening sealant which will not crack, shrink or change color with age.
- C. All fixtures and component parts shall conform to governing codes.
- D. All fixtures shall be securely mounted level and plumb or as recommended by the manufacturer. Mount fixtures intended to be accessible to the handicapped at the dimensions required by code.

### **3.03 STARTUP**

- A. Adjust flush valves, pressure reducing valves, mixing valves, water heater thermostats, and similar equipment.
- B. Remove construction protection, tags and labels and thoroughly clean all plumbing equipment and trim. Scour all fixtures just prior to building acceptance.

**END OF SECTION**

BLANK PAGE

**SECTION 23-0500  
HVAC MATERIALS AND METHODS**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

- A. The provisions of the General Requirements, Supplementary Requirements, and Division 1 apply to the HVAC work specified in this Division.
- B. The requirements of this Section apply to the HVAC systems specified in these Specifications and in other Division 23 sections.
- C. Provide all items, articles, materials, equipment, operations and/or methods listed, mentioned, shown and/or scheduled on the Drawings and/or in these Specifications, including all labor, supervision, services, permits, fees, and incidentals necessary and required to provide a complete and operable facility with complete systems as shown, specified, and required by applicable codes.
- D. The work shall include, but not be limited to, the following systems:
  - 1. Fuel supply system.
  - 2. Central heating and cooling equipment.
  - 3. Complete piping systems including insulation, valves, supports, etc.
  - 4. Air handling equipment including packaged equipment and exhaust fans.
  - 5. Air distribution systems including ductwork, terminal units, dampers, insulation, and air inlets and outlets.
  - 6. HVAC control system.
  - 7. Assist Commissioning Agent as required by Commissioning specification.
- E. Advise subcontractor, suppliers, and vendors involved in the work specified in this Section of the applicable requirements.

**1.02 QUALITY ASSURANCE**

- A. All work and materials shall conform to all applicable local and state codes and all federal, state and other applicable laws and regulations. All clarifications and modifications which have been cleared with appropriate authorities are listed under the applicable sections. All electrical products shall bear the label of a recognized testing laboratory such as UL or CSA.
- B. Whenever the requirements of the Specifications or Drawings exceed those of the applicable code or standard, the requirements of the Specifications and Drawings shall govern.
- C. Codes and Standards: Comply with the provisions of the following referenced codes, standards and specifications:
  - 1. Federal Specifications (FS)
  - 2. American National Standards Institute (ANSI)
  - 3. National Electrical Manufacturer's Association (NEMA)
  - 4. National Fire Protection Association (NFPA)
  - 5. Underwriters Laboratories, Inc. (UL)
  - 6. Factory Mutual (FM)
  - 7. International Building Code (IBC) with State and Local Amendments
  - 8. International Mechanical Code (IMC) with State and Local Amendments
  - 9. Uniform Plumbing Code (UPC) with State and Local Amendments
  - 10. American Society for Testing and Materials (ASTM)
  - 11. Americans with Disabilities Act (ADA)
  - 12. International Fire Code (IFC) with State and Local Amendments
  - 13. Energy Policy Act (EPAAct)
  - 14. Manufacturers Standardization Society (MSS)
  - 15. American Gas Association (AGA)

- D. Each piece of equipment furnished shall meet all detailed requirements of the Drawings and Specifications and shall be suitable for the installation shown. Equipment not meeting all requirements will not be acceptable, even though specified by name. Where two or more units of the same class of equipment are furnished, use product of the same manufacturer; component parts of the entire system need not be products of same manufacturer. Furnish all materials and equipment, new and free from defect and of size, make, type and quality herein specified or approved by the Architect. All materials shall be installed in a neat and professional manner.
- E. All apparatus shall be built and installed to deliver its full rated capacity at the efficiency for which it was designed.
- F. The Drawings and Specifications are complementary. What is called for by one shall be as though called for by both.
- G. Drawings: Do not scale drawings for roughing-in measurements, nor use as shop drawings. Make field measurements and prepare shop drawings. Coordinate work with shop drawings of other specification divisions. See Article 3.1 for more information and requirements.
- H. Field Wiring: It is the intent of these specifications that all systems shall be complete and operable. Refer to all drawings and specifications, especially the electrical drawings, to determine voltage, phase, circuit ampacity and number of connections provided. Provide all necessary field wiring and devices from the point of connection indicated on the electrical drawings. All equipment shall be installed in compliance with the Electrical Code and the equipment's UL listing. Bring to the attention of the Architect in writing, all conflicts, incompatibilities, and/or discrepancies prior to bid or as soon as discovered.

### **1.03 WORK OF OTHER CONTRACTS**

- A. Work under this contract shall be conducted in a manner to allow for the future installations of such equipment or items listed in other sections of this Specification.

### **1.04 WORK OF OTHER DIVISIONS**

- A. Work under this Division shall be conducted in a manner to cooperate with the installation of such equipment or items as specified in other Divisions.
- B. Plumbing piping systems and fixtures and fire suppression piping systems are specified under other Divisions of these Specifications except for provisions or items specifically noted on the Drawings or specified herein.
- C. Consult all Drawings and Specifications in this project and become familiar with all equipment to be installed. Coordinate all aspects of the construction with the other trades on the job to ensure that all work and materials required to provide a complete and operational facility are included in the bid.
- D. All sections of Division 23 are interrelated and shall be considered in their entirety when interpreting any material, method, or direction listed in any section of Division 23. Individual sections are not written for specific Subcontractors or suppliers but for the General Contractor.

### **1.05 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES (SUBMITTALS)**

- A. Submit in accordance with Division 1 full technical and descriptive shop drawing data on proposed materials and equipment as detailed in each section.
- B. The Contractor shall verify that all equipment submitted can be delivered and installed within the time constraints of the construction period.
- C. Include the manufacturer, type, style, catalog number, complete specification, certified dimensions, and description of physical appearance for each item and option submitted. Reproduction of catalog data sheets shall be clean and legible to show all details, including gauge of metal used.



- D. Include only information on exact equipment to be installed, not general catalogs of the manufacturer. Where sheets show proposed equipment as well as other equipment, identify proposed equipment with rubber stamp arrow or similar concise method.
- E. Submit with each copy a transmittal letter verifying that all included equipment submittals have been carefully considered for quality, dimensions, function, and have been coordinated with the Drawings and Specifications. Guarantee that proposed materials will meet or exceed the quality and function of those specified.
- F. Include field wiring diagrams and connection diagrams for all control and/or low voltage systems, including floor plans.
- G. Submittal Review: The submittal review process is a means to provide quality control. The action noted to be taken (or where conflicts with the contract documents are not noted) shall not be interpreted by the Contractor as automatic "change orders." Approval of the data for substitution and shop drawings shall not eliminate the Contractor's responsibility for compliance with Drawings or Specifications, nor shall it eliminate the responsibility for freedom from errors of any sort in the data discovered prior to or after the review process. Deviations, discrepancies, and conflicts between the submittals and the Contract Documents shall be called to the Architect's attention in writing at the time of transmittal of the data.
- H. Submittals shall be in the form of PDF documents. Arrange submittals numerically with specification sections identified in tabs. All required sections shall be submitted at one time. **Partial submittals will be rejected without review.**
- I. For adhesives and sealants used on the interior of the building (inside the waterproofing system), include printed statement of volatile organic compound (VOC) content.

#### 1.06 PRODUCT SUBSTITUTION

- A. Materials other than those specified may be approved for this project providing a written request is submitted to the Architect prior to bid in accordance with Instructions to Bidders. Requests shall include complete specifications, dimensions, manufacturer and catalog number for each item for which approval is desired. If, in the opinion of the Architect, the material is not complete or if it is not an acceptable substitute, he may reject it. The Architect's evaluation will be based solely on the material submitted.

#### 1.07 CHANGE ORDERS

- A. All supplemental cost proposals by the Contractor shall be accompanied by a complete itemized breakdown of labor and materials without exception. At the Architect's request, the Contractor's estimating sheets for the supplemental cost proposals shall be made available to the Architect. Labor must be separated and allocated for each item of work.

#### 1.08 RECORD DOCUMENTS

- A. Project Record (As-Installed) Drawings:
  1. Maintain a set of record drawings on the job site as directed in Division 1.
  2. Keep Drawings clean, undamaged, and up to date.
  3. Record and accurately indicate the following:
    - a. Depths, sizes, and locations of all buried and concealed piping dimensioned from permanent building features.
    - b. Locations of all valves with assigned tag numbers.
    - c. Locations of all fire dampers and other airflow control devices.
    - d. Changes, additions, and revisions due to change orders, obstructions, etc. Eradicate extraneous information.
    - e. Model numbers of installed equipment.
  4. Make Drawings available when requested by Architect for review.
  5. Submit as part of the required Project Closeout documents. Final submittal will be in the form of reproducible drawings.

6. Quality of entire set of project record drawings to match the quality of the contract documents; quality to be judged by Architect. Computer-aided design drafting (CADD) shall be used to complete project record drawings. Use standards set in contract documents. Note field modifications, all addenda, and change order items on project record drawings. If deficiencies are found in either the quality or the accuracy of the drawings, they will be returned unapproved. Additional review of subsequent submissions shall be at the Contractor's expense.
- B. Operating and Maintenance Manuals: Submit Operating and Maintenance Instructions, including manufacturer's service data, wiring diagrams, and parts lists and vendors for all serviceable items of equipment, valve charts, balancing data, final control diagrams showing final set points, duct and piping pressure test reports, equipment startup records, and any additional equipment added by change order. Provide any performance curves, data, and model numbers from submittals. Comply with provisions of Division one where applicable to the mechanical work. Submittal shall be in the form of a PDF file per specification section. Arrange submittals numerically with equipment type or classification identified in tabs. Manufactures O&M manuals shall be provided as a single PDF file that can be hyper-linked by Owner for reference. O&M manuals that are a series of PDF files will not be accepted.

## **1.09 WARRANTY**

- A. Furnish, prior to application for final payment, three copies of written and signed guarantee effective a period of one year from date of completion and acceptance of entire project; agree to correct, repair and/or replace defective materials and/or equipment or the results of defective workmanship without additional expense to the Owner. Where no response satisfactory to the Owner has occurred within three working days from the written report of a warranty covered defect, the contractor shall agree to pay for the cost of repair of the reported defect by a contractor of the Owner's choice.
- B. Where the manufacturer's guarantee exceeds one year, the longer guarantee shall govern and include the Contractor's labor.

## **PART 2 PRODUCTS**

### **2.01 GENERAL**

- A. General: Provide all new materials and equipment, identical to apparatus or equipment in successful operation for a minimum of two years. Provide materials of comparable quality omitted here but necessary to complete the work. Maximum allowable variation from stated capacities, minus 5% to plus 10% as approved in each case.
- B. Compatibility: Provide products which are compatible with other portions of the work and provide products with the proper or correct power and fuel-burning characteristics, and similar adaptations for the project.
- C. Efficiency: Heating and cooling equipment shall comply with ASHRAE Standard 90.1-2010 and the State Energy Code. Where equipment efficiencies are indicated, the use of alternate or substitute manufacturer's equipment with lower efficiencies is not permitted.
- D. Storage and Handling:
  1. Delivery: Deliver to project site with manufacturer's labels intact and legible.
  2. Handling: Avoid damage.
  3. Storage: Inside protected from weather, dirt and construction dust. Where necessary to store outside, elevate well above grade and enclose with durable, waterproof wrapping.

### **2.02 STARTERS AND SWITCHES**

- A. Manufacturers: Cerus Industrial Model numbers are listed. General Electric, ABB, Allen Bradley, Schneider Electric, Eaton, are approved if equal. Provide starters by same manufacturer throughout project.
- B. General: Provide each motor with starter or switch as approved and recommended by manufacturer of motor or equipment of which motor is a part. All starters shall include integral disconnect.

- C. System Description
1. Single Phase Starter: Starters for 115VAC single phase motors less than 1 HP shall be capable of both manual and automatic operation. Refer to Section D for single phase starter requirements.
  2. Magnetic Starters: Starters for 3-phase motors shall be magnetic starters. Refer to Section E for magnetic starter requirements.
- D. Enclosed Full Voltage Non-Reversing (FVNR) Single Phase Starter
1. Single Phase Motor Starter Control: The single phase motor starter shall consist of a manually operated quick-make toggle mechanism lockable in the "Off" position which shall also function as the motor disconnect. Additionally, the starter shall provide thermal overload protection, run status pilot light and fault pilot light. The starter must include the capability to operate in both manual and automatic control modes. In automatic mode, the starter shall have the capability to integrate with a building automation system by providing terminals for run input, run status output and fault output. All control terminals shall be integrated in the starter. At a minimum, each single phase starter shall include an interposing run relay and current sensing status output relay. Single phase motor starter shall be in a surface mount enclosure.
  2. Approved manufacturer: Cerus Industrial, model BAS-1P or approved equal.
- E. Enclosed Full Voltage Non-Reversing (FVNR) Non-Combination Starter
1. Magnetic Motor Starters shall be enclosed in a general purpose electrical enclosure with the appropriate environmental rating.
  2. Starters shall consist of a horsepower rated magnetic contactor with a minimum of 1NO and 1NC auxiliary contacts and solid state electronic overload relay. Overload relay shall protect all three phases with a wide range current setting and trip class to allow field adjustment for specific motor FLA. Overload relay shall provide phase failure, phase loss, locked rotor and stall protection.
  3. Provide a manual reset pushbutton on the starter cover to restore normal operation after a trip or fault condition.
  4. Each starter shall include an installed 50VA control power transformer (CPT) with protected secondary. The CPT must accept the available line voltage and the control voltage shall not exceed 120V.
  5. Installed accessories shall include Hand-Off-Auto operation switch with 22mm style operator interfaces. Include LED pilot light indicators for Hand, Off, Auto, Run and Overload conditions. All pilot devices shall be water tight and dust tight.
  6. When remotely controlled by an automation system, the starter shall include remote run terminals which accept both a voltage input signal and a contact closure. The voltage run input shall accept both AC and DC signals including 24VAC, 120VAC, 24VDC and 48VDC to allow direct connection of the transistorized automation signal to the starter.
  7. In applications where the motor is interlocked with a damper or valve, the actuator control must reside within the starter enclosure. The starter must provide a voltage output to operate the actuator to open the damper or valve without closing the motor circuit. The starter will only close the motor circuit and start the motor after it has received a contact closure from a limit or end switch confirming the damper or valve position.
  8. Manufacturer shall provide and install tags with engraved white lettering to designate equipment served.
- F. Enclosed Full Voltage Non-Reversing (FVNR) Combination Starter / Disconnect
1. Magnetic Motor Starters shall be enclosed in a general purpose electrical enclosure with the appropriate environmental rating.
  2. Starters shall consist of a horsepower rated magnetic contactor with a minimum of 1NO and 1NC auxiliary contacts and solid state electronic overload relay. Overload relay shall protect all three phases with a wide range current setting and trip class to allow field adjustment for specific motor FLA. Overload relay shall provide phase failure, phase loss, locked rotor and stall protection.
  3. Provide a manual reset pushbutton on the starter cover to restore normal operation after a trip or fault condition.
  4. Each starter shall include an installed 50VA control power transformer (CPT) with protected secondary. The CPT must accept the available line voltage and the control voltage shall not exceed 120V.

5. Installed accessories shall include Hand-Off-Auto operation switch with 22mm style operator interfaces. Include LED pilot light indicators for Hand, Off, Auto, Run and Overload conditions. All pilot devices shall be water tight and dust tight.
  6. When remotely controlled by an automation system, the starter shall include remote run terminals which accept both a voltage input signal and a contact closure. The voltage run input shall accept both AC and DC signals including 24VAC, 120VAC, 24VDC and 48VDC to allow direct connection of the transistorized automation signal to the starter.
  7. In applications where the motor is interlocked with a damper or valve, the actuator control must reside within the starter enclosure. The starter must provide a voltage output to operate the actuator to open the damper or valve without closing the motor circuit. The starter will only close the motor circuit and start the motor after it has received a contact closure from a limit or end switch confirming the damper or valve position.
  8. Provide and install tags with engraved white lettering to designate equipment served.
  9. Enclosed combination starters shall include all of the magnetic starter requirements in addition to a disconnecting method. Acceptable disconnects include: motor circuit protectors or UL 489 circuit breakers. All disconnects shall include a lock-out mechanism when in the off position.
  10. The Motor Circuit protector shall be a UL listed 508 current limiting manual motor starter with magnetic trip elements only. The breaker shall carry a UL 508F rating (up to 100A frame size) which provides for coordinated short circuit rating for use with the motor contactor and provides a minimum interrupting rating of 30,000 AIC for the combination starter.
  11. Disconnect shall be UL 98 suitable for service entrance protection.
  12. UL 489 breaker shall include thermal and magnetic trip mechanisms.
  13. Provide over/under voltage and phase monitoring capability. Monitor shall be field adjustable for both over and under voltage levels and a delay time before returning to normal operation after a trip.
- G. Quality Assurance
1. Manufacturer shall provide a five year warranty on the complete starter assembly.
  2. The starter assembly shall be UL listed under UL 508A.

### 2.03 SOLID-STATE, VARIABLE-SPEED MOTOR CONTROLLERS

- A. General: Controllers listed and labeled as a complete unit and arranged to provide variable speed of a standard NEMA Design B 3-phase induction motor by adjusting output voltage and frequency of controller. Designed and rated by the manufacturer for the type of load (e.g., fans, blowers, and pumps) used and also approved by the manufacturer for the type of connection used between the motor and load (direct connection or power transmission connection).
- B. Input Line Reactors: 5% for reduction of harmonics.
- C. Output Line Reactors: Specially designed and constructed for IGBT controllers and designed to protect motor from voltage spikes over 150% of the bus voltage. Required where controller to motor cable length exceeds 50 feet. Provide dV/dT filters for 460 volt motors with cable lengths in excess of 300'.
- D. In lieu of providing line reactors, the drive manufacturers may submit a power system analysis demonstrating compliance with IEEE 519.
- E. Ratings:
  1. Output Ratings: 3-phase, 6 to 60 Hz, with voltage proportional to frequency throughout the voltage range.
  2. Starting Torque: 100 percent of rated torque, or as indicated.
  3. Speed Regulation: Plus or minus 1 percent.
  4. Ambient Temperature: 0° C to 40° C.
  5. Efficiency: 98 percent at normal power levels.
- F. Isolated Control Interface: Allow the controller to follow one of the following over an 11:1 speed range:
  1. Electrical Signal: 4 to 20 milliamperes at 24 V.

- G. Internal Adjustability: Provide the following internal adjustment capabilities:
  1. Minimum Speed: 5 to 25 percent of maximum RPM.
  2. Maximum Speed: 80 to 100 percent of maximum RPM.
  3. Acceleration: 2 to 22 seconds.
  4. Deceleration: 2 to 22 seconds.
  5. Current Limit: 50 to 110 percent of maximum rating.
  
- H. Self-Protection and Reliability Features:
  1. Input transient protection by means of surge suppressors.
  2. Snubber networks to protect against malfunction due to system voltage transients.
  3. Motor Overload Relay: Adjustable and capable of NEMA class 10 performance.
  4. Notch filter to prevent operation of the controller-motor-load combination at a natural frequency of the combination.
  5. Instantaneous Overcurrent Trip.
  6. Loss of Phase Protection.
  7. Reverse Phase Protection.
  8. Under- and Over-Voltage Trips.
  9. Overtemperature Trip.
  10. Short Circuit Protection.
  
- I. Automatic Reset/Restart: Attempt three restarts after controller fault or on return of power to the system following an interruption and before shutting down for manual reset or fault correction. Provide for restarting during deceleration without damage to the controller, motor, or load.
  
- J. Serial Communications: The VFD shall have an EIA-485 port as standard. The standard protocols shall be Modbus and BACnet MS/TP. The use of third party gateways and multiplexers is not acceptable. All protocols shall be certified by the governing authority (i.e. BTL Listing for BACnet).
  
- K. EMI / RFI filters: All VFDs shall include onboard EMI/RFI filters. The onboard filters shall allow the entire VFD assembly to be CE Marked and the VFD shall meet product standard EN61800-3 for the First Environment restricted. No Exceptions.
  
- L. Operation and Maintenance Features: Include:
  1. Status Lights: Door-mounted LED indicators to indicate power on, run, overvoltage, line fault, overcurrent, and external fault.
  2. Elapsed Time Meter.
  3. Panel-Mounted Operator Station: Start-stop and auto-manual selector switches with manual speed control potentiometer.
  4. Current-Voltage-Frequency Indicating Devices: Mount meters or digital readout device and selector switch flush in controller door and connect to indicate controller output.
  5. Provide with non-fused disconnect rated for drive capacity. Disconnect shall be UL 98 suitable for service entrance.
  
- M. For drives to be mounted outside install in a NEMA 3R enclosure with ventilation fan to control cabinet temperature below 135°F.
  
- N. Acceptable Manufacturers: Subject to compliance with requirements.
  1. ABB Power Distribution, Inc.

#### **2.04 ACCESS PANELS**

- A. Manufacturers: Inryco/Milcor, Bilco, Elmdor, Karp, Potter-Roemer or accepted substitute. Inryco/Milcor Style DW, K, or M panels as required by construction.
  
- B. Construction: Flush style, fire rated in fire rated partitions and ceilings. Provide flush key cylinder locks on all access panels less than 8' above the floor in public spaces. Turn keys over to Owner at project completion. Screwdriver latches on all others.
  
- C. Floor Access Doors:
  1. Provided with recessed pan to receive floor material to match adjacent.
  2. Frame shall be 1/4" extruded aluminum with built-in neoprene cushion and continuous anchor flange.

3. Door shall be 1/4" aluminum plate reinforced with aluminum stiffeners as required.
4. Stainless steel hinges shall be bolted to underside and pivot on torsion bars that counterbalance the door for easy operation.
5. Door shall open 90 degrees and lock automatically in that position. A vinyl grip handle shall be provided to release the cover for closing.
6. Door shall be built to withstand a live load of 150 lbs per sq. ft. and equipped with a cylinder lock and threaded cover plug.
7. Aluminum shall be mill finish.
8. Installation shall be in accordance with manufacturer's instructions.
9. Manufacturer shall guarantee against defects in material or workmanship for a period of five years.
10. Bilco Type TER or approved.

## 2.05 EXPANSION JOINTS AND LOOPS

- A. Flexible Expansion/Seismic Loop: Factory fabricated assembly consisting of two 90 degree elbows, two lengths of flexible hose, and a 180 degree return bend to allow free movement in three axis. Return bend shall include attachment point for support and a drain/vent fitting. Hose shall be corrugated metal style with metal overbraid. Connections to match piping system except connection 2" and larger shall be flanged style. Metraflex "Metraloop."

## 2.06 METERS AND GAUGES

- A. General: Install meters and gauges where shown on the plans or specified elsewhere in these specifications.
- B. Pressure-Temperature Test Plugs:
  1. 1/4" or 1/2" NPT fitting of solid brass capable of receiving either an 1/8" OD pressure or temperature probe and rated for zero leakage from vacuum to 1000 psig. Neoprene valve core for temperatures to 200 deg. F., Nordel to 350 deg. F.
  2. Provide for each test plug a pressure gauge adapter with 1/16" or 1/8" OD pressure probe.
  3. Furnish a test kit containing one 2-1/2" dial pressure test gauge of suitable range, one gauge adapter with 1/16" or 1/8" OD probe and two 5" stem pocket test thermometers – one 0 to 220 degrees F and one 50 to 550 degrees F. Turn the kit over to the Architect.
  4. Cisco "P/T Plugs," Peterson "Pete's Plug" or approved substitute.
- C. Thermometers: Liquid-in-glass, adjustable stem, separable sockets, plus 40 to 240 degrees F range (unless indicated otherwise). Weiss numbers are listed. Equivalent Taylor, Trerice, Weksler or approved substitute.
  1. Wide case (9") in equipment rooms and all major equipment items. Weiss "9VS" Series.
  2. Narrow case (7") in all other locations. Weiss "7VS" Series.
- D. Pressure Gauges: Install on suction and discharge of all pumps and where shown on Drawings 4-1/2" dial, 0-100 psig graduation pressure gauges with Ashcroft No. 1106 pulsation dampers and stop cocks. Weiss UGE-1 or equivalent Ashcroft, Marsh, Trerice, Weksler.

## 2.07 VALVES

- A. General: Provide factory fabricated valves of the type, body material, temperature and pressure class, and service indicated. Bronze gate, globe and check valves shall comply with MSS-SP-80. Ball valves shall comply with MSS-SP-110. Iron gate and globe valves shall comply with MSS-SP-70. Iron check valves shall comply with MSS-SP-71. Butterfly valves shall comply with MSS-SP-67. Valve size same as connecting pipe size.
- B. Acceptable Manufacturers: Milwaukee, Crane, Grinnell, Nibco, Hammond, Stockham, Legend, Watts, and Walworth. Grooved end valves Victaulic, Gruvlock, or accepted substitute. NIBCO numbers are given except as noted. Where possible, provide valves from a single manufacturer.
- C. Valve Styles: See individual Division 23 sections for valve styles.

- D. Butterfly Valve Operators: Locking lever for shut-off service; "Memory Stop" for lever handle with 10-position throttling plate for throttling service; gear operator with babbitt sprocket rim for chain-operated valves and gear operators on all 8" or larger valves.
- E. Butterfly Valve Style: Lug-type with cap screws for all valves utilized for equipment isolation for servicing. Lug and grooved style valves shall be capable for use as isolation valves and recommended by manufacturer for dead-end service at full system pressure.
- F. Insulated Valves: Install extended-stem valves in all piping specified as insulated, and arrange in the proper manner to receive insulation.
- G. Mechanical Actuators: Provide mechanical actuators with chain operators where indicated, where valves 4" and larger are mounted more than 7' above the floor, and where manual operation is difficult because of valve size, pressure differential or other operating conditions. Drop chains to 6'-6" above the floor.
- H. Selection of Valve Ends (Pipe Connections): Select and install valves with ends matching the types of pipe/tube connections.

## 2.08 HANGERS AND SUPPORTS

- A. General: Provide factory-fabricated horizontal piping hangers, clamps, hanger rod, inserts, supports, etc., of the indicated MSS type and size. The Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry Practice SP-58 and SP-69 are referenced in this section.
- B. Manufacturers: B-Line, Carpenter & Paterson, Grinnell, Michigan, Superstrut, Tolco, Erico, or accepted substitute. Grinnell figure numbers in parentheses where applicable (or other manufacturers as noted).
- C. Corrosion Protection: Provide materials which are zinc plated or factory painted to prevent corrosion. Prevent electrolysis in the support of copper tubing by the use of copper hangers (copper coated alone is not sufficient), strut cushion, or at least two layers of UPC 10 mil tape.
- D. Seismic Requirements: Provide seismic restraints in accordance with OSSC Section 1613. Design restraint systems in accordance with "Seismic Restraint Manual: Guidelines for Mechanical Systems," Second Edition, 1998, SMACNA, or "A Practical Guide to Seismic Restraint" ASHRAE RP-812, 1999.
- E. Horizontal Piping Hangers and Supports:
  1. Adjustable Clevis Hanger: MSS Type 1 (Fig. 260).
  2. Adjustable Band Hanger: MSS Type 7 (Fig. 97), fabricated from steel.
  3. Adjustable Swivel-Band Hanger: MSS Type 10 (Fig. 70).
  4. Clamp: MSS Type 4 (Fig. 212, 216).
  5. Double-Bolt Clamp: MSS Type 3 (Fig. 295A, 295H), including pipe spacers.
  6. Adjustable Saddle-Support: MSS Type 36 (Fig. 258) and MSS Type 37 (Fig. 259), including saddle, pipe and reducer. Fabricate base-support from steel pipe and include cast-iron flange or welded-steel plate.
  7. Channel Support System: Galvanized, 12 gauge channel and bracket support systems, single or double channel as indicated on the Drawings or as required by piping and equipment weights. Grinnell "Power Strut" channel. Acceptable Manufacturers: Super Strut, Globestrut, Bee, Kindorf or Unistrut.
- F. Vertical Pipe Clamps:
  1. Two-Bolt Riser Clamp: MSS Type 8 (Fig. 261).
  2. Four-Bolt Riser Clamp: MSS Type 42 include pipe spacers at inner bolt-holes.
- G. Hanger Attachment:
  1. Hanger Rod: Rolled threads, zinc plated. Right hand threaded.
  2. Turnbuckles: MSS Type 13 (Fig. 230).
  3. Weldless Eye-Nut: MSS Type 17 (Fig. 290).
  4. Malleable Eye-Socket: MSS Type 16 (Fig. 110R).
  5. Clevises: MSS Type 14 (Fig. 299).

- H. Building Attachments:
  - 1. Concrete Inserts: MSS Type 18 (Fig. 282), steel or Grinnell Power-Strut PS349 continuous channel. Acceptable Manufacturers: Michigan Hanger, Globestrut, Unistrut, Super Strut.
  - 2. Clamps: MSS Type 19 (Fig. 285, 281), Type 20, 21 (Fig. 225, 226, 131), Type 23 (Fig. 86, 87, 88), Type 25 (Fig. 227), Type 27 through 30 where applicable.

## 2.09 IDENTIFICATION MARKERS

- A. Pipe Markers:
  - 1. Adhesive pipe markers of width, letter size and background color conforming to ANSI A13.1.
  - 2. Acceptable Manufacturers: Brady B946 with arrow banding tape or similar Seaton, Zeston, MSI.
- B. Duct Markers:
  - 1. Adhesive duct markers 2 1/4"x14" with black text indicating contents on white background with directional flow arrow.
  - 2. Acceptable Manufacturers: Brady B946 or similar Seaton, Zeston, MSI.
- C. Nameplates:
  - 1. Engraved nameplates, 1/16" thick, laminated 2-ply plastic, bottom ply white, outer ply black, letters formed by exposing bottom ply.
  - 2. Size: 2" by 4" nameplates with 1/4" high letters.
- D. Valve Tags:
  - 1. 2" diameter, 18-gauge polished brass tags with 3/16" chain hole and 1/4" high stamped, black-filled service designation.
  - 2. Acceptable Manufacturers: Seaton, Brady, MSI.
- E. Valve Identification: Tag all valves with brass disc and chain. Prepare valve charts indicating valve number, size, location, concealed or exposed, function, valve manufacture and model number, and normal position. Provide floor plan as part of record Drawings. Use no duplicate numbers in Plumbing and Heating systems. Mount glazed frames containing one set of valve charts in the building mechanical room.
  - 1. Include floor plan of each floor level with valve tag numbers indicated at approximate valve locations. Provide separate maps for plumbing valves and HVAC valves. Maps are to be 11"x17".
  - 2. Label all ceilings directly below or access panels directly in front of plumbing or HVAC valves using engraved, printed labels or hanging tags stating the valve ID as shown on the Valve Map and the Valve Tag Directory.

## 2.10 PENETRATION FIRE STOPPING

- A. Through-penetration fire stopping system tested and listed by Underwriters Laboratories. 3M, Metacaulk, SpecSeal, or approved.
- B. Select system for proper application based on wall construction, type of penetrating item, wall rating, etc.
- C. Sealants and Primers – General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No. 1168.

## 2.11 PENETRATION AT ACOUSTICAL PROTECTION WALLS

- A. See details on Drawings.
- B. Materials:
  - 1. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No. 1168.
    - a. Architectural Sealants: 250 g/L.
    - b. Sealant Primers for Porous Substrates: 775 g/L.



- c. Sealant Primers for Porous Substrates: 775 g/L.
- 2. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
  - a. Products:
    - 1) Pecora Corporation; AC-20 FTR.
    - 2) Tremco Incorporated; Tremflex 834.
    - 3) USG Corporation; SHEETROCK Acoustical Sealant.
- 3. Joint Backing: Round, closed cell, non-gassing foam rod compatible with sealant; ASTM C 1330 Type B, cylindrical, bi-cellular material; oversized 30 to 50 percent larger than joint width.
  - a. Products:
    - 1) Sof Rod manufactured by Nomaco Inc.
    - 2) Sonolastic Soft Backer-Rod manufactured by BASF.
- 4. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than require by South Coast Air Quality Management District Rule No. 1168.

## **PART 3 EXECUTION**

### **3.01 LAYOUT AND COORDINATION**

- A. Site Examination: Before starting work, carefully examine site and all contract Drawings. Become thoroughly familiar with conditions governing work on this project. Verify all indicated elevations, building measurements, roughing-in dimensions and equipment locations before proceeding with any of the work.
- B. Utility Locations: The location of existing utilities, wires, conduits, pipes, ducts, or other service facilities are shown in a general way only on the Drawings and are taken from existing records. Ascertain whether any additional facilities other than those shown on the plans may be present and determine the exact location and elevations of all utilities prior to commencing installation.
- C. Sleeves, Inserts, Cast-in-Place Work: Provide sleeves, inserts, anchoring devices, cast-in-place work, etc. which must be set in concrete sequenced at the proper time for the project schedule.
- D. Coordination:
  - 1. The Drawings are based on equipment of a certain manufacturer and may be identified as such. Where alternate manufacturers or approved substitutes are incorporated into the work, any required design changes are the responsibility of the contractor. Such changes may include changes in utility or system connection sizes, location, or orientation, service clearances, structural support or acoustic considerations.
  - 2. Prepare accurate AutoCAD shop drawings showing the actual physical dimensions required for the installation for duct work, piping and mechanical devices. Submit drawings prior to purchase/fabrication/installation of any of the elements involved in the coordination. Provide drawing files to other trades for coordination.
  - 3. Cooperate with other trades in furnishing material and information for sleeves, bucks, chases, mountings, backing, foundations and wiring required for installation of mechanical items.
  - 4. Coordinate all work with other trades and determine in advance where interfacing of the mechanical work and other work are required to be connected together. Provide all materials and equipment to make those connections. Submit shop drawings showing required connections where special conditions exist.
- E. Discrepancies: Report immediately any error, conflict or discrepancy in Plans, Specifications and/or existing conditions. Do not proceed with any questionable items of work until clarification of same has been made. Should rearrangement or re-routing of piping be necessary, provide for approval the simplest layout possible for that particular portion of the work.

### 3.02 UTILITY COORDINATION

- A. Utility Coordination: Coordinate all aspects of the incoming utility services indicated with the City Engineer, serving utility, and the off-street improvements Contractor. Requirements of the utility company which exceed the provisions made on the Drawings or covered by these Specifications shall take precedence. Provisions made on the Drawings or Specifications in excess of the utility company's requirements shall take precedence. No additional compensation will be allowed the Contractor for connection fees or additional work or equipment not covered in the Drawings or Specifications which are a result of policies of the serving utilities.

### 3.03 MECHANICAL EQUIPMENT WIRING

- A. Provide all mechanical equipment motors, automatic temperature, limit, float and similar control devices required, with wiring complete from power source indicated on Electrical Drawings.
- B. Provide properly rated motor overload and undervoltage protection and all manual or automatic motor operating devices for all mechanical equipment.
- C. Equipment and systems shown on the Drawings and/or specified, are based upon requirements of specific manufacturers which are intended as somewhat typical of several makes which may be approved. Provide all field wiring and/or devices necessary for a complete and operable system including controls for the actual selected equipment/system.
- D. Provide all starters for mechanical motors. Review Electrical Specifications and Drawings to determine starter sizes. Adjust fusing/time delay on all starters once installed.

### 3.04 GENERAL INSTALLATION

- A. Locating and Positioning Equipment: Observe all Codes, Regulations and good common practice in locating and installing mechanical equipment and material so that completed installation presents the least possible hazard. Maintain adequate clearances for repair and service to all equipment and comply with Code requirements.
- B. Arrangement: Arrange piping parallel with primary lines of the building construction, and with a minimum of 7' overhead clearance in all areas where possible. Unless indicated otherwise, conceal all piping. Locate operating and control equipment properly to provide easy access, and arrange entire mechanical work with adequate access for operation and maintenance. Give right-of-way to piping which must slope for drainage. Set all equipment level or as recommended by manufacturer. Under no conditions shall beams, girders, footings or columns be cut for mechanical items. Casting of pipes into concrete is prohibited unless so shown on Drawings.
- C. Drip Pans: Provide drip pans under all above ceiling in-line pumps and cooling coils. Locate pan immediately below piping and equipment, and extend a minimum of 6" on each side and lengthwise 18" beyond equipment being protected. Fabricate pans 2" deep, of reinforced 20 gauge galvanized sheet metal with watertight seams and rolled or hemmed edges. Provide 3/4" drainage piping, properly discharged to over floor drain or as shown on the Drawings. Comply with Mechanical Code for overflow protection and pipe sizing.
- D. Access Panels: Provide access panels with proper backing reinforcement for all equipment, dielectric unions, valves and items requiring service and installed above ceilings, behind walls, or in furring, complete with correct frame for type of building construction involved. Exact size, number and location of access panels are not necessarily shown on Drawings. Use no panel smaller than 12" by 12" for simple manual access or smaller than 16" x 20" where personnel must pass through.
- E. Adjusting: Adjust and calibrate all automatic mechanical equipment, temperature controls, float devices, etc. Adjust flow rates at each piece of equipment or fixture.
- F. Building Vapor Barrier: Wherever the building insulation vapor barrier is penetrated by piping, hangers, conduits, etc., provide clear self-adhesive tape recommended by the insulation manufacturer around the penetrations.

- G. Housekeeping Pads: Construct minimum 6" thick with chamfered edges using 3000 psi concrete. Provide #4 reinforcing bars 8" on center in each direction and within 4" of each edge, centered in pad thickness. Provide 1/2" dowel with 3" embedment into floor slab for each 2 square feet of pad area. Dowels and equipment anchor bolts shall be spaced a minimum of 6" from pad edges.

### 3.05 VALVE INSTALLATION

- A. General: Comply with the following requirements:
  - 1. Install valves where required for proper operation of piping and isolation of equipment, including valves in branch lines where necessary to isolate sections of piping, and where shown on the drawings. Install valves at low points in piping systems that must be drained for service or freeze protection.
  - 2. Locate valves in accessible spaces (or behind access panels) and so that separate support can be provided when necessary.
  - 3. Install valves with stems pointed up, in the vertical position where possible, but in no case with stems pointed downward from a horizontal plane.
- B. Insulated Valves: Install extended-stem valves in all piping specified as insulated, and arrange in the proper manner to receive insulation.
- C. Valve Access: Provide access panels to all valves installed behind walls, in furring or otherwise inaccessible.

### 3.06 INSTALLATION OF HANGERS AND SUPPORTS

- A. General: Proceed with the installation of hangers, supports and anchors only after the required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) the proper placement of inserts, anchors and other building structural attachments.
  - 1. Install hangers, supports, clamps, and attachments to support piping and equipment properly from the building structure. Use no wire or perforated metal to support piping, and no supports from other piping or equipment. For exposed continuous pipe runs, install hangers and supports of the same type and style as installed for adjacent similar piping.
  - 2. Prevent electrolysis in the support of copper tubing use of at least 2 layers of UPC listed 10 mil tape at all bearing surfaces or strut clamp cushion. Copper plated hangers alone are not sufficient.
  - 3. Arrange supports to prevent eccentric loading of joists and joist girders. Locate supports at panel points only.
- B. Provisions for Movement:
  - 1. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate the action of expansion joints, expansion loops, expansion bends and similar units. Install specified seismic restraints to restrict excessive movement.
  - 2. Install hangers and supports so that equipment and piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
  - 3. Install hangers and supports to provide the indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 are not exceeded. Comply with the following installation requirements:
    - a. Clamps: Attach clamps, including spacers (if any), to piping outside the insulated piping support. Do not exceed pipe stresses allowed by ANSI B31.
    - b. Insulated Pipe Supports: Insulated pipe supports shall be supplied and installed on all insulated pipe and tubing.
    - c. Load Rating: All insulated pipe supports shall be load rated by the manufacturer based upon testing and analysis in conformance with ASME B31.1, MSS SP-58, MSS SP-69 and MSS SP-89.
    - d. Support Type: Manufacturer's recommendations, hanger style and load shall determine support type.

- e. Insulated Piping Supports: Where insulated piping with continuous vapor barrier or where exposed to view in finished areas is specified, install hard maple wood insulation shields (Elcen Fig. 216) or steel pipe covering protection shields (MSS type 39) at each hanger.

C. Pipe Support:

- 1. Vertical Spacing: Support at base, at equivalent of every floor height (maximum 10' as required by Code) and just below roof line.
- 2. Screwed or Welded Steel or Copper Piping: Maximum hanger spacing shall be as follows:

	<u>Steel</u>	<u>Copper</u>
1-1/4" and smaller	7' span	6' span
1-1/2" pipe	9' span	6' span
2" pipe	10' span	10' span
2-1/2" & larger	12' span	10' span

- 3. Install additional hangers or supports at concentrated loads such as pumps, valves, etc. to maintain alignment and prevent sagging.
- 4. Support Rod: Hanger support rods sized as follows:

<u>Pipe and Tube Size</u>		<u>Rod Size</u>	
<u>Inches</u>	<u>mm</u>	<u>Inches</u>	<u>mm</u>
1/2" to 4"	12.7 to 101.6	3/8"	9.5
5" to 8"	127.0 to 203.2	1/2"	12.7
10" to 12"	254.0 to 304.8	5/8"	15.9

- 5. Provide manufactures approved channel continuously below all horizontal PEX or other plastic pipe where hung from structure.

- D. Adjust hangers and supports to bring piping to proper levels and elevations.
- E. Provide all necessary structural attachments such as anchors, beam clamps, hanger flanges and brackets in accordance with MSS SP-69. Attachments to beams wherever possible. Supports suspended from other piping, equipment, metal decking, etc., are not acceptable.
- F. Horizontal banks of piping may be supported on common steel channel member spaced not more than the shortest allowable span required on the individual pipe. Maintain piping at its relative lateral position using clamps or clips. Allow lines subject to thermal expansion to roll axially or slide. Size channel struts for piping weights.
- G. Installation of drilled-in concrete anchors shall comply with the manufacturer's instructions for working load, depth of embedment, and spacing between anchors and from the edge of the slab. Use only wedge-style anchors.
- H. Seismic Restraints: Install restraints where recommended in SMACNA "Seismic Restraint Manual" and as required by code. Show analysis of supporting structure, anchorages, and restraints in accordance with OSSC Section 16 and reference ASCE standard. Seismic restraint system components shall be approved by the California Office of Statewide Health Planning and Development (OSHPD). Acceptable Manufacturers: Amber/Booth, Mason Industries, Tolco, or approved. Contractor shall submit calculations and shop drawings, sealed and signed by a Professional Engineer, showing seismic restraint design for all equipment, piping and ductwork required to be braced. **Seismic importance factor for new building is 1.5. For remodeled areas seismic importance factor is 1.0.**
- I. Ensure all copper piping is protected from contact with non-copper supports. Provide strut cushion below clamp or 2 layers of UPC listed 10 mil tape.

### 3.07 HVAC SYSTEM IDENTIFICATION

- A. Piping System: Indicate each pipe system by its generic name (abbreviated) as shown/scheduled/specified. Comply with ANSI A13.1 for marker locations, letter sizes, and colors. Include arrows to show direction of flow and "Electric Traced" signs to identify heat cable wrapped piping. Locate pipe labels in accessible areas as follows:
  - 1. Near each valve, meter, gauge, or control device.

2. Near equipment such as pumps, heat exchangers, water heaters, etc.
  3. At piping branch connections.
  4. At penetrations (each side) of walls, ceilings, and floors.
  5. At access panels and doors.
  6. At 25 foot maximum intervals. Provide a minimum of one label above each room where lift-out ceiling is installed. Reduce intervals in congested areas such as mechanical rooms.
- B. Equipment: Provide engraved plastic-laminate signs at locations of major equipment such as heat exchangers, pumps, etc. Identify equipment in field same as on drawings. Permanently mount in an appropriate and effective location.
- C. Operation Tags: Where needed for proper and adequate information on operation and maintenance of mechanical systems, provide tags of plasticized card stock, either pre-printed or hand printed to convey the message; example: "DO NOT CLOSE THIS VALVE EXCEPT WHEN THE PUMP IS OFF."

### **3.08 EQUIPMENT CONNECTIONS**

- A. Provide complete connections for all items of equipment requiring such connections, including incidental piping, fittings, trim and labor necessary for a finished working installation.
- B. Verify the rough-in and finish requirements for all equipment provided under other Divisions of the work and requiring HVAC piping or duct connections with equipment supplier and installer prior to rough-in.

### **3.09 PROTECTION**

- A. Protect all work and materials against loss or damage. Close all pipe openings with caps or plugs. At final completion, thoroughly clean and deliver all work and equipment in an unblemished new condition. Keep all motors and bearings in watertight and dustproof covers during entire course of installation.
- B. Protect floors, walls, framing and sheathing where pipe cutting and threading operations are conducted with plastic sheeting under plywood sheets. Extend plastic sheeting beyond the plywood. Clean-up metal cuttings, oil, etc., daily or as necessary to prevent debris from being tracked beyond the protected area. Damages, as determined by the Architect, due to the pipe cutting/threading operation shall be repaired by the responsible trade.

### **3.10 CUTTING AND PATCHING**

- A. General: Comply with the requirements of Division 1 for the cutting and patching of other work to accommodate the installation of mechanical work. Do all necessary cutting and patching of existing building and yard surfaces required for completion of the mechanical work. Patch to match finish and color of adjacent surfaces. Coordinate work in remodel and new areas to avoid cutting of new finished surfaces.

### **3.11 PIPE PENETRATION FIRE STOPPING**

- A. Install as recommended by manufacturer and in accordance with the product's UL listing. Below are the minimum installation requirements.
1. Install specified penetrating item(s) with required annular spacing in proper size wall or floor opening. Support penetrating item(s) adequately on both sides of construction.
  2. Clean all opening and penetrating item surfaces in penetration area to remove loose debris, dirt, oil, wax, grease, old caulking, etc.
  3. If needed or required for gypsum or concrete block walls, install specified galvanized steel wire mesh or sleeve recessed and centered inside wall around penetrating item(s) so that it is snug against perimeter of opening.
  4. When required, install specified type and depth of backing material in annular space, recessed to required fill depth of fire stopping caulking.
  5. Gun, trowel, and/or pump fire stopping sealant to specified depth in annular space around penetrating item(s). Trowel sealant surfaces flush with wall or floor surfaces to a smooth, defect-free finish. Where required, apply specified size caulking bead around penetrating item(s) at zero annular contact areas and tool smooth.

- B. Drawings show some, not all, of the penetration. Review architectural drawings for all fire walls.
- C. Sealants and Primers – General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No. 1168.

### **3.12 MECHANICAL PAINTING**

- A. Minimum Requirements: Comply with minimum requirements of Division 9, Painting. All mechanical equipment, piping, insulation, etc., exposed in finished areas, storage rooms and other locations except mechanical equipment rooms will be painted under Section 09 9000.
- B. Iron Work: Paint hangers, rods, anchors, guides, threads of galvanized pipe, bases, supports, uncoated sheet metal and other iron work without factory finish, exposed to weather, one coat acid-resisting black paint. Apply one (1) coat Dixon's Aluminum Graphite No. 209 paint over the (1) coat primer as recommended by paint manufacturer to all hot metal surfaces.
- C. Sheet Metal: Apply one coat of zinc chromate to mechanical sheet metal exposed to weather, except no painting required on aluminum or stainless steel. Apply one coat of flat black paint to the inside of unlined ducts behind all grilles and registers.

### **3.13 HVAC WORK CLOSEOUT**

- A. General: Refer to the Division 1 sections for general closeout requirements. Calibrate all equipment requiring same. Complete each system as shown or specified herein and place in operation except where only roughing-in or partial systems are called for. Each system shall be tested and left in proper operation free of leaks, obstructions, or contamination.
- B. Record Drawings: Submit record set of Drawings required in Division 1 as previously specified in this Section.
- C. Closeout Equipment/Systems Operations: Sequence operations properly so that work of project will not be damaged or endangered. Coordinate with seasonal requirements. Operate each item of equipment and each system in a test run of appropriate duration with the Architect present, and with the Owner's operating personnel present, to demonstrate sustained, satisfactory performance. Adjust and correct operations as required for proper performance. Clean and lubricate each system and replace dirty filters, excessively worn parts and similar expendable items of the work.
- D. Operating Instructions: Conduct a walk-through instruction seminar for the Owner's personnel who are to be involved in the continued operation and maintenance of the HVAC equipment and systems. Provide written instructions outlining and explaining the identification system, operational diagrams, emergency and alarm provisions, sequencing requirements, seasonal provisions, security, safety, efficiency and similar features of the systems.

**END OF SECTION**

**SECTION 23-0548**  
**MECHANICAL SOUND AND VIBRATION CONTROL**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

- A. The requirements of this section apply to the vibration isolation for mechanical equipment specified elsewhere.

**1.02 QUALITY ASSURANCE**

- A. Isolator Engineering: Selected and furnished by the equipment manufacturer. Select isolators for 98% efficiency unless indicated otherwise on the Drawings.
- B. Manufacturer: Provide field installed isolation required from a single manufacturer where possible.

**1.03 SUBMITTALS**

- A. Provide product data sheets on all vibration isolators and seismic restraints.
- B. Provide itemized list showing the items of equipment or piping to be isolated, isolator type and model number selected, isolator loading and deflection, and reference to specified drawings showing frame and construction.
- C. Provide manufacturer's drawings showing equipment frame construction for each item including dimensions, structural member sizes and support locations.

**PART 2 PRODUCTS**

**2.01 ACCEPTABLE MANUFACTURERS**

- A. Manufacturers: Amber/Booth, Mason Industries, Vibration Mountings and Controls, Kinetics Noise Control.
- B. Manufacturer Model Numbers: Amber/Booth figure numbers are listed unless indicated otherwise.

**2.02 VIBRATION ISOLATORS**

- A. Types of Isolators:
  - 1. Hanger with Spring and Rubber Stop: Combination neoprene element and spring hangers – Hangers shall consist of a steel frame containing a neoprene isolation element at the top and a coil steel spring seated in a neoprene cup on the bottom. Both the element and the cup shall be molded with a neoprene bushing that passes through the steel frame. The neoprene element shall be capable of an average deflection of 0.35". The steel springs shall be capable of a minimum static deflection of 0.75" with a minimum additional travel to solid of 1/2". Spring diameters and hanger box lower hole size shall be large enough to permit the hanger rod to swing through a 30 degree arc before contacting the box and short circuiting the spring. Hangers shall be factory precompressed 60% of the total deflection determined by the assigned load per hanger. Hangers shall be manufactured with provision for bolting or attaching to ceiling flat iron straps, rods or steel runners. Hangers shall be of a fail-safe design. Amber / Booth BSRA.

2. Neoprene Pads: Neoprene pads shall be of waffle or ribbed design, 1/4" – 3/8" thick. They shall be installed as a single layer or in multiple layers with 16 gauge steel shims cemented between so that the combination of stiffness and total neoprene thickness achieves the static deflection listed in the vibration isolation schedule in conjunction with a distributed load area that will maintain 10-50 psi. If the equipment support location does not completely cover the pads or does not consist of flat steel footing, an additional full coverage, load distribution plate of minimum 3/8 steel shall be placed between the pad and attached to the equipment support. There shall be no rigid structure between top and bottom of mount. Amber / Booth Type NR Ampad.
- B. Neoprene Mounts: Neoprene mounts shall be one piece, neoprene molded assemblies with a minimum loaded static deflection of 0.25". The mount shall incorporate both rubber-in-shear and compression load characteristics. All metal surfaces shall be neoprene covered. The mount shall have friction pads both top and bottom. Bolt holes shall also be provided for both surfaces. The top bolt hole shall be threaded. There shall be no rigid structure between top and bottom supports. Amber / Booth Type RV.
  - C. Noise and Vibration Barrier Hanger: For ductwork and piping where indicated. Target Enterprises Inc. "ARH-1" or accepted substitute.
  - D. Seismic and Start-Up Restraints: Select all isolators to withstand seismic loads equivalent two times the isolator load rating applied from any direction. Mason Industries type Z-1011 on all isolated equipment not utilizing isolators with integral restraints.
  - E. Flexible Pipe Connectors - Type SS: All stainless steel hose and braid with carbon steel connections. Male thread ends on flexible connectors 2" and smaller, and flanged connections on 1-1/2" and larger connectors.
  - F. Ductwork Flexible Connections:
    1. Typical connections shall be made of 30 ounce woven glass fiber, coated with neoprene, sewn together at the edges and joints.
    2. The flexible connections shall be approximately 6" long and held in place with 1" wide bands of 12 gauge galvanized steel bolted to duct and to outlets and inlets of the units and fans with 1/8" stove bolts, 5" o.c.
    3. It is the intent that these flexible connections shall withstand the operating air pressure, shall not permit air leakage and shall not transmit vibration.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. General: Install vibration isolators and flexible connectors as specified herein, as shown on the Drawings and as recommended by manufacturer.
- B. Ductwork Flexible Connections: Install flexible duct connections on all externally spring isolated air handling units including roof mounted units down through roof curbs (and/or to unit side duct connections). Fan connections, both at inlet and discharge, shall be made with flexible materials so as to prevent the transfer of vibration from fans to ductwork connected thereto.
- C. Flexible Pipe Connections:
  1. Provide flexible connections on all piping to spring isolated equipment, where indicated on Drawings and for all coils mounted in spring isolated air handling units or plenums. Coils in rigid units and plenums do not require flexible connectors. Provide a flexible connection in both the supply and return connections to the coil as near the coil as possible.
  2. Install connectors in a straight line as recommended by the manufacturer without offsets or twists and support pipe without any load on flexible connectors. Minimum live length shall be as follows:

<u>Pipe Size</u>	<u>Minimum Live Length</u>
1" through 1-1/2"	8"
2" through 2-1/2"	10"
3" through 4"	12"



Over 4"

18"

- D. Anchorage: Anchor all isolators to the floor, wall or ceiling structure and anchor points reinforced where necessary. Anchor bolts, cap screws, etc., shall not be continuous through the isolator such that vibrations are transmitted to the structure.
- E. Adjustment: Adjustable during and after installation, to ensure sufficient clearance between vibration isolation element and rigid restraining device. Do not install isolators until they have been loaded and adjusted to achieve the specified static deflection and clearances.
- F. Housekeeping Pads: Construct minimum 3" thick with chamfered edges using 3000 psi concrete. Provide #4 reinforcing bars 8" on center in each direction and within 4" of each edge, centered in pad thickness. Provide 1/2" dowel with 3" embedment into floor slab for each 2 square feet of pad area. Dowels and equipment anchor bolts shall be spaced a minimum of 6" from pad edges.

### **3.02 EQUIPMENT RESTRAINTS**

- A. All equipment shall be anchored to resist displacement including sliding, swinging, and overturning due to seismic forces. Friction due to equipment weight shall not be considered as anchorage.
- B. Contractor shall submit shop Drawings showing seismic restraint design for all equipment weighing 400 lbs. or more. Design shall show analysis of supporting structure, anchorages, and restraints in accordance with OSSC Section 16.

**END OF SECTION**

BLANK PAGE

**SECTION 23-0590**  
**TESTING, ADJUSTING AND BALANCING**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

- A. Work Included: After completion of the work of installation, test and regulate all components of the new heating, air conditioning and ventilating systems to verify air volumes and heating-cooling flow rates indicated on the Drawings.
- B. Balancing Organization:
  - 1. Balancing of the Heating and Air Conditioning Systems: Performed by a firm providing this service established in the State of Oregon.
  - 2. Balancing Organization: Approval by Architect. Air Balancing Specialties, Neudorfer Engineers, Northwest Engineering Services, or approved.
  - 3. Provide all necessary personnel, equipment, and services.
- C. Balancer shall perform work as a Contractor to the General Contractor directly, not through the Mechanical Contractor.

**1.02 QUALITY ASSURANCE**

- A. Balancing of the Heating and Air Conditioning Systems: Agency shall be a current member of NEBB or AABC specializing in the adjusting and balancing of systems specified with a minimum of 10 years documented experience.
- B. Testing, adjusting, and balancing shall be performed under direct field supervision of a Certified NEBB Supervisor or a Certified AABC Supervisor.
- C. See Commissioning Specification for additional requirements.

**1.03 SUBMITTALS**

- A. See Section in Division 1, Administrative Requirements, for submittal procedures.
- B. Submit name of adjusting and balancing agency for approval within 30 days after award of Contract.
- C. Field Reports: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
  - 1. Submit under provisions of Section 23 0500.
  - 2. Prior to commencing work, submit report forms or outlines indicating adjusting, balancing, and equipment data required.
  - 3. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
  - 4. Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
  - 5. Include detailed procedures, agenda, sample report forms, and copy of AABC National Project Performance Guaranty or other certifying agency prior to commencing system balance.
  - 6. Test Reports: Indicate data on AABC MN-1 forms, forms prepared following ASHRAE 111, NEBB forms, or forms containing information indicated in Schedules.
  - 7. Include the following on the title page of each report:
    - a. Name of testing, adjusting, and balancing agency.
    - b. Address of testing, adjusting, and balancing agency.
    - c. Telephone number of testing, adjusting, and balancing agency.
    - d. Project name.
    - e. Project location.
    - f. Project Architect and Owner.
    - g. Project Engineer.

- h. Project Contractor.
  - i. Project altitude.
  - j. Report date.
- D. Project Record Documents: Record actual locations of flow measuring stations and balancing valves and rough setting.
- E. Provide a list of equipment, air supply, return and exhaust, heating water, and chilled water systems not in compliance with tolerances subsequently specified.

## **PART 2 PRODUCTS**

**-- NOT USED --**

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
1. Systems are started and operating in a safe and normal condition.
  2. Temperature control systems are installed complete and operable.
  3. Proper thermal overload protection is in place for electrical equipment.
  4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
  5. Duct systems are clean of debris.
  6. Fans are rotating correctly.
  7. Fire and volume dampers are in place and open.
  8. Air coil fins are cleaned and combed.
  9. Access doors are closed and duct end caps are in place.
  10. Air outlets are installed and connected.
  11. Duct system leakage is minimized.
  12. Hydronic systems are flushed, filled, and vented.
  13. Pumps are rotating correctly.
  14. Proper strainer baskets are clean and in place.
  15. Service and balance valves are open.
- B. Submit field reports. Report defects and deficiencies noted during performance of services which prevent system balance.
- C. Beginning of work means acceptance of existing conditions.

### **3.02 INSTALLATION TOLERANCES**

- A. Air Handling Systems: Adjust to within plus 10 percent or minus 5 percent of design for supply systems and +/- 10 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets: Adjust total to within plus 10 percent or minus 5 percent of design to space. Adjust outlets and inlets in space to within +/- 10 percent of design.
- C. Hydronic Systems: Adjust to within +/- 10 percent of design.

### **3.03 ADJUSTING**

- A. Ensure recorded data represents actual measured or observed conditions.
- B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

- E. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

### **3.04 AIR SYSTEM PROCEDURE**

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities.
- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust noise distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to the extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- K. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.
- L. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.02" (12.5 Pa) positive static pressure near the building entries.
- M. For variable air volume system powered units, set volume controller to air flow setting indicated. Confirm connections are properly made and confirm proper operating for automatic variable air volume temperature control. Adjust drives to maximum airflow for highest static condition (maximum amps of motor). Allow VFD to regulate airflow per specification.
- N. Space pressure Control, Return Fan Speed Endpoints: For variable air volume system with terminal unit zoning, attain return fan speed control endpoints based on the following values for the given operating mode. Coordinate with the HVAC Control Contractor for system setup and provide values when determined.

Return Fan Speed Endpoint Values				
Mode	Supply Fan Speed Hi/Lo Reset Limits	Desired Space Pressure (InH2O)	Economizer Position	Return Fan Speed
Full Heating (All terminal units are operating at heating flow setpoints)	TBD – Noted during the full heating condition	<b>Ideal - 0.02</b> Acceptable Test Range: 0.01 – 0.03	Min-Min (25% of the minimum ventilation requirement)	Minimum Return Fan Speed-TBD
Full Cooling (All terminal units are operating at cooling flow setpoints)	TBD – Noted during the full cooling condition	<b>Ideal - 0.02</b> Acceptable Test Range: 0.01 – 0.03	Min-Max (100% of the minimum ventilation requirement)	Maximum Return Fan Speed-TBD

- O. CO2 controller set points – minimum CO2 setpoint (ppm), maximum CO2 setpoint (ppm)(setting for min OSA at full occupancy).
- P. Outside air intake damper settings at minimum CO2 and maximum CO2 setpoint.

### 3.05 SCHEDULES

- A. Equipment Requiring Testing, Adjusting, and Balancing:
  1. Plumbing pumps
  2. HVAC pumps
  3. Air cooled water chillers
  4. Air coils
  5. Fan coil units
  6. Air handling units
  7. Fans
  8. Air filters
  9. Air terminal units
  10. Air inlets and outlets
- B. Report:
  1. Summary Comments:
    - a. Design versus final performance
    - b. Notable characteristics of system
    - c. Description of systems operation sequence
    - d. Summary of outdoor and exhaust flows to indicate amount of building pressurization.
    - e. Nomenclature used throughout report
    - f. Test conditions
  2. Instrument List:
    - a. Instrument
    - b. Manufacturer
    - c. Model number
    - d. Serial number
    - e. Range
    - f. Calibration date
- C. Electric Motors:
  1. Manufacturer
  2. Model/frame
  3. HP/BHP
  4. Phase, voltage, amperage; nameplate, actual, no load
  5. RPM
  6. Service factor
  7. Starter size, rating, heater elements
  8. Sheave make/size/model

- D. V-Belt Drives:
  1. Identification/location
  2. Required driven RPM
  3. Driven sheave, diameter, and RPM
  4. Belt, size, and quantity
  5. Motor sheave diameter and RPM
  6. Center to center distance, maximum, minimum, and tested
  
- E. Refrigerant Cooling Coils:
  1. Identification/number
  2. Location
  3. Service
  4. Manufacturer
  5. Air flow, design and actual
  6. Entering air DB temperature, design and tested
  7. Entering air WB temperature, design and tested
  8. Leaving air DB temperature, design and tested
  9. Leaving air WB temperature, design and tested
  10. Air pressure drop, design and tested
  11. Saturated suction temperature, design and tested
  
- F. Heating Coils:
  1. Identification/number
  2. Location
  3. Service
  4. Manufacturer
  5. Air flow, design and tested
  6. Entering air temperature, design and tested
  7. Leaving air temperature, design and tested
  8. Air pressure drop, design and tested
  
- G. Air Moving Equipment:
  1. Location
  2. Manufacturer
  3. Model number
  4. Serial number
  5. Arrangement/Class/Discharge
  6. Air flow, specified and tested
  7. Return air flow, specified and tested
  8. Outside air flow, specified and tested
  9. Total static pressure (total external), specified and tested
  10. Inlet pressure
  11. Discharge pressure
  12. Sheave make/size/bore
  13. Number of Belts/Make/Size
  14. Fan RPM
  
- H. Return Air/Outside Air:
  1. Identification/location
  2. Supply air flow, design and tested
  3. Return air flow, design and tested
  4. Outside air flow, design and tested
  5. Return air temperature
  6. Outside air temperature
  7. Mixed air temperature, design and tested
  
- I. Exhaust Fans:
  1. Location
  2. Manufacturer
  3. Model number
  4. Serial number
  5. Air flow, specified and tested
  6. Total static pressure (total external), specified and tested
  7. Inlet pressure

8. Discharge pressure
  9. Sheave Make/Size/Bore
  10. Number of Belts/Make/Size
  11. Fan RPM
- J. Duct Traverses:
1. System zone/branch
  2. Duct size
  3. Area
  4. Design velocity
  5. Design air flow
  6. Test velocity
  7. Test air flow
  8. Duct static pressure
  9. Air temperature
  10. Air correction factor
- K. Terminal Unit Data:
1. Manufacturer
  2. Type, constant, variable, single, dual duct
  3. Identification/number
  4. Location
  5. Model number
  6. Size
  7. Minimum static pressure
  8. Minimum air flow, design and tested
  9. Maximum air flow, design and tested
  10. Inlet static pressure, design and tested
- L. Air Distribution Tests:
1. Air terminal number
  2. Room number/location
  3. Terminal type
  4. Terminal size
  5. Area factor
  6. Design velocity
  7. Design air flow
  8. Test (final) velocity
  9. Test (final) air flow
  10. Percent of design air flow

### 3.06 DETAILED REQUIREMENTS

- A. Adjusting and Balancing:
1. Adjust and balance all portions of the mechanical systems to produce indicated results within limits of minus 5 or plus 10 percent or as subsequently directed by the Architect.
  2. Balancing data may be spot checked with instruments similar to that used by the balancing firm.
  3. If, in the judgment of the Architect, the discrepancies warrant additional adjustment, readjust and rebalance the systems at no additional project cost.
- B. Duct Pressure Test: To be conducted and/or witnessed by balancer.

**END OF SECTION**



**SECTION 23-0700  
HVAC INSULATION**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

- A. The requirements of this section apply to the insulation of mechanical equipment specified elsewhere in these specifications.
- B. Related Work: The requirements of Section 23 0500, Common HVAC Materials and Methods, also apply to this section.

**1.02 QUALITY ASSURANCE**

- A. Insulation Thickness and Thermal Performance: Comply with provisions of the State of Oregon Energy Code.
- B. Composite (Insulation, Jacket or Facing and Adhesives) Fire and Smoke Hazard Ratings: Not to exceed a flame spread of 25 or smoke development of 50 and containing less than 0.1% by weight deca-PDE fire retardant.
- C. Component Ratings of Accessories (Adhesives, Mastics, Cements, Tapes, Finishing Cloth for Fittings): Same as "B" requirements above and permanently treated. No water soluble treatments.

**1.03 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. General: In addition to the requirements specified in Section 23 0500, the following apply:
  - 1. Deliver insulation, coverings, cements, adhesives and coatings to the site in factory-fabricated containers with the manufacturer's stamp or label affixed showing fire hazard ratings of the products. Store insulation in original wrappings and protect from weather and construction traffic.
  - 2. Protect insulation against dirt, water, chemical and mechanical damage. Do not install damaged insulation. Remove such insulation from project site.

**1.04 SUBMITTALS**

- A. Submit catalog data and performance characteristics for each product specified.

**PART 2 PRODUCTS**

**2.01 ACCEPTABLE MANUFACTURERS**

- A. Insulating Manufacturers: Johns Manville, Knauf, Armstrong, Owens-Corning, Pittsburgh Corning, Pabco, Imcoa or Certain Teed. Johns Manville products are listed unless indicated otherwise.
- B. Adhesive Manufacturers: Foster, 3M, Insul-Coustic, Borden, Kingco or Armstrong.

**2.02 PIPING INSULATION**

- A. Interior and Exterior Piping Systems 50 to 850 Deg. F: Glass fiber preformed pipe insulation with a minimum K-value of 0.23 at 75 Deg. F, a minimum density of 3.5 pounds per cubic foot within all-service vapor barrier jacket, vinyl or pre-sized finish and pressure sensitive seal containing less than 0.1% by weight deca-PDE fire retardant.
- B. Exterior Installations: Same as for interior installations except 0.016" aluminum finish jacket

- C. Pipe Temperatures Minus 30 to 180 Deg. F: Flexible, preformed, pre-slit, self-sealing elastomeric pipe insulation up to 2-1/8" ID, thermal conductivity of 0.27 BTU/hr. sq. ft./in. at 75 deg. F and vapor transmission rating of 0.2 perms/inch. Apply in thickness necessary to prevent condensation on the surface at 85 deg. F and 70% RH. Armstrong "Armaflex 2000" or, in concealed locations, Imcoa or Nomaco also approved.
- D. Interior Piping Systems 32 to 50 Deg. F: Glass fiber preformed pipe insulation with a minimum K-value of 0.23 at 75 deg. F, a minimum density of 3.5 pounds per cubic foot. Polymer vapor barrier jacket containing less than 0.1% by weight deca-PDE fire retardant and with pressure sensitive seal and wicking system to remove condensation from pipe surface. Owens Corning "VaporWick."

### **2.03 DUCT INSULATION**

- A. Interior Above Grade Ductwork: Glass fiber formaldehyde-free blanket with "FSK" facing, k value = 0.31 at 75 deg. F, 0.2 perms, and UL 25/50 surface burning rating. Johns Manville "Microlite."

### **2.04 EQUIPMENT INSULATION**

- A. Equipment Temperatures Below 70 Deg. F: Flexible, closed cell, elastomeric sheet insulation of 5.5 #/cubic feet density and 0.27 thermal conductivity at 75 deg. F. Armstrong "Armaflex."
- B. Equipment Temperatures From 70 to 450 Deg. F: Glass fiber 3 pound density insulation with a 0.23 thermal conductivity at 75 deg. F. Johns Manville "814 Spin-Glas" with "FSK" jacket containing less than 0.1% by weight deca-PDE fire retardant or finished as recommended by manufacturer.

### **2.05 INSULATION ACCESSORIES**

- A. Insulation Compounds and Materials: Provide rivets, staples, bands, adhesives, cements, coatings, sealers, welded studs, etc., as recommended by the manufacturers for the insulation and conditions specified except staples not permitted on chilled water lines.
- B. Interior Tanks and Equipment Insulation Covering: Finished metal jacket or as recommended by the manufacturer for insulation material specified.
- C. PVC Protective Jacketing and Valve and Pipe Fitting Covers: Johns Manville Zeston 2000, Proto LoSmoke, or Ceel-Co Ceel-Tite 100 Series with precut fitting fiberglass insulation or approved.
- D. Jacket Lap Sealing Adhesives: Foster Drion 85-75 contact cement or approved substitute.
- E. Saddles and Shields: Unless otherwise indicated and except as specified in piping system specification sections, install the following types:
  1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
  2. Protection Shields (MSS Type 40): Of length recommended by manufacturer to prevent crushing insulation.
  3. Thermal-Hanger Shield Inserts: For supporting insulated pipe, 360-degree insert of high-density, 100-psi (690-kPa) minimum compressive strength, water-repellent-treated calcium silicate or cellular-glass pipe insulation, same thickness as adjoining insulation with vapor barrier and encased in 360-degree sheet metal shield.

## **PART 3 EXECUTION**

### **3.01 PIPING INSULATION**

- A. General: Do not insulate underground piping except at joints and fittings on preinsulated piping unless indicated otherwise.
- B. Refrigerant Piping Insulation: Insulate suction piping with minimum 1/2" thick foamed plastic for lines smaller than 1". For lines 1" or larger use 1" thick foamed plastic. Where possible, slip insulation over the piping as it is installed. Seal all joint and seams.

- C. Pipe Fittings:
  1. Insulate and finish all fittings including valve bodies, bonnets, unions, flanges and expansion joints with fitting of same material as pipe insulation. Seal to adjacent insulation for continuous vapor barrier covering over all fittings.
  2. Provide removable/reusable insulation covers on 4" and larger valves, unions, flanges, pump casings, strainers and similar fittings or equipment requiring periodic service.
  
- D. Protective Covering: Install continuous protective PVC or metal covering on all piping and fittings in mechanical rooms below 8' AFF, and where insulation may be subject to damage. Install with rivets or cement seams and joints. Piping in tunnels need not be covered with PVC jacketing.
  
- E. Insulated Piping: Comply with the following.
  1. Attach clamps and spacers to piping.
    - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    - c. Do not exceed pipe stress limits according to ASME B31.9.
  2. Install MSS SP-58, Type 39 or Type 40 protection saddles, if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
    - a. Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN100) and larger if pipe is installed on rollers.
  3. Shield Dimensions for Pipe: Not less than the following.
    - a. NPS 1/4 to NPS 3-1/2 (DN8 to DN90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
    - b. NPS 4 (DN100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.
    - c. NPS 5 and NPS 6 (DN125 and DN150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.
    - d. NPS 8 and NPS 14 (DN200 and DN350): 24 inches (610 mm) long and 0.075 inch (1.91 mm) thick.
    - e. NPS 16 and NPS 24 (DN400 and DN600): 24 inches (610 mm) long and 0.105 inch (2.67 mm) thick.
  4. Pipes NPS 8 (DN200) and Larger: Include wood inserts.
  5. Insert Material: Length at least as long as protective shield.
  6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.
  
- F. Piping Insulation Lap Seams and Butt Joints: Install insulation jacket in accordance with manufacturer's recommendation. Where jacket joint and lap seams have not adhered, remove affected section of insulation and reinstall or apply lap sealing adhesive in accordance with manufacturer's instructions.

### 3.02 DUCTWORK INSULATION

- A. Ductwork: Insulate the following:
  1. All supply ductwork.
  2. All supply and return ductwork in systems routed in unconditioned spaces or exposed to the outside conditions.
  3. All outside air intake ducts.
  4. All ductwork required to be insulated by code.
  5. All relief ducts.
  
- B. Insulation Thickness: Select board and blanket insulation of thickness required to provide the following installed R-value.
  1. All heating or cooling system supply and return ducts located on the exterior of the insulated building envelope and all outside air intake ducts.
    - a. R-8
  2. All heating and cooling system supply ducts located inside of building envelope or in unconditioned spaces, R-5.
  3. All heating and cooling system return ducts located in vented spaces, R-8.

- C. Fittings: Wire and duct adhesive as required. To prevent sagging on all rectangular or square ducts over 24" wide, install Gramweld or equal welding pins on the bottom. Maximum spacing 18" on center in both directions.
- D. Installation: Applied with butt joints, all seams sealed with vapor seal mastic or taped with 2" wide vapor-proof, pressure-sensitive tape. Seal all penetrations with vapor barrier adhesive.
- E. Internally Lined Ductwork: Where internally lined ductwork is indicated on the Drawings and/or specified, no exterior insulation is required. Select duct lining to provide the required R-value. Carefully lap the ends of the exterior insulation a minimum of 6" past the interior insulation unless otherwise shown. Seal the end of vapor barrier jacket to the duct with mastic where the vapor barrier is required. Duct lining is specified in Section 23 3000.

### **3.03 EXPANSION JOINTS**

- A. Insulation: Insulate expansion joints on heating and/or cooling piping to match thickness of adjacent piping. Build up piping insulation adjacent to the expansion joints sufficiently to allow internal clearance within the insulation for the diameter of the expansion joint. Fasten one end of the expansion joint insulation securely and provide aluminum or sheet metal on the built-up insulation at the other end to permit movement of the insulation without damage.
- B. Finish: Finish as specified for adjacent piping with fireproof covering.

**END OF SECTION**

**SECTION 23-2300  
REFRIGERANT PIPING SYSTEM**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

- A. The requirements of this section apply to the refrigerant piping system connecting refrigeration and HVAC equipment specified in other sections of these specifications. Provide pipe, pipe fittings and related items required for complete piping system.
- B. Related Work: The requirements of Section 23 0500, Common HVAC Materials and Methods, also apply to this section.

**1.02 QUALITY ASSURANCE**

- A. General: ASTM, and ANSI Standards are indicated. In addition, special standards are referenced where neither ASTM nor ANSI Standards are applicable. Comply with federal and local regulations regarding the handling of refrigerant.
- B. Labeling: All piping shall be continuously and legibly labeled on each length as required by codes and standards and including as a minimum, country of origin, manufacturer's identification marking, wall thickness designation, and applicable standards and approvals. Fittings shall be labeled as required by the referenced standard. Tubular fixture traps shall be stamped with manufacturer's mark and material thickness.
- C. Air Conditioning and Refrigeration Equipment Rating: Rated in accordance with ARI certified rating procedures and bear the ARI label.
- D. Installation Contractor: Manufacturer's authorized installation and start-up agency normally engaged and experienced in air conditioning/refrigeration work and certified in the handling of refrigerant.

**1.03 SUBMITTALS**

- A. Submit catalog data, construction details, and performance characteristics for each type and size of refrigeration equipment.
- B. Submit operating and maintenance data.
- C. Provide design Drawings showing routing, pipe size, traps, and devices necessary for a complete installation between coil and condensing unit or heat pump.

**1.04 STORAGE AND HANDLING**

- A. Provide factory-applied end caps on each length of pipe and tube. Maintain end caps through shipping, storage and handling as required to prevent pipe-end damage and eliminate dirt and moisture from inside of pipe and tube. Protect flanges and fittings from moisture and dirt by inside storage and enclosure, or by packaging with durable, waterproof wrapping.

**PART 2 PRODUCTS**

**2.01 PIPING MATERIALS**

- A. Copper Pipe and Tube:
  - 1. Application:
    - a. Refrigerant.
    - b. Condensate.
  - 2. Pipe: ASTM B88. Type ACR hard temper copper with soldered joints. Cleaned and sealed at the factory.
  - 3. Refrigerant Fittings: ANSI/ASME B31.5 or SAE J 513-F, "Refrigeration Tube Fittings." Where conflicts occur, B31.5 shall govern.

- B. Copper Pipe and Tube:
  1. Application: Refrigerant.
  2. Pipe: U.L. recognized for 700 psi working pressure with insulation consisting of polyethylene outer layer, 1/2" thick (for lines less than 1" diameter), ASTM E84 25/50 rated. Assembly shall be made in the U.S.A. Cleaned and sealed at the factory.
  3. See restrictions for use in installation.
- C. Copper Pipe and Tube:
  1. Application: Cooling coil condensate drain.
  2. UPC approved copper fitting with EPDM o-ring.
  3. Press fit connection.
  4. Viega Pro Press approved.
- D. Copper Pipe and Tube:
  1. Application: Cooling coil condensate drain.
  2. Pipe: Type L hard temper copper with brazed or soldered joints, ASTM B88. Brazing required for 2" and larger lines.
  3. Fittings: Wrought copper solder-joint fittings, ANSI B16.22.
- E. Plastic Pipe:
  1. Application:
    - a. Cooling coil condensate drain where concealed in walls.
    - b. Cooling coil condensate drain in mechanical or service areas where continuously supported per specifications.
  2. Pipe:
    - a. Polyvinyl Chloride and Chlorinated Polyvinyl Chloride Plastic Pipe for Water Service: SDR-PR pipe, ASTM D2241; Schedules 40, 80 and 120, ASTM D1785.
  3. Fittings: Provide fittings of the type indicated, matching piping manufacturer. Where not otherwise indicated, provide socket style, solvent weld fittings produced and recommended by the piping manufacturer for the service indicated.

## 2.02 MISCELLANEOUS PIPING MATERIALS/PRODUCTS

- A. Brazing Materials: Provide brazing filler rod and flux materials as determined by the installer to comply with installation requirements.
- B. Gaskets for Flanged Joints: ANSI B16.21 with pressure and temperature rating required for the service indicated.

## 2.03 REFRIGERATION SPECIALTIES

- A. General: Provide the following equipment where they are not a part of the factory installed equipment accessories. Select equipment for operation with the refrigerant being utilized and for the pressure and temperature conditions indicated. Sporlan, Alco, Henry, Detroit, or as listed for each equipment.
- B. Thermostatic Expansion Valve: Capacity matched for the system, angle or straight through pattern external equalizer, brass body complete with capillary and remote sensing bulb.
- C. Solenoid Valves: For installation in liquid, suction and/or hot gas circuit as indicated. Brass body, replaceable coil of voltage indicated.
- D. Liquid and Moisture Indicators: Moisture and liquid indicator installed after the liquid line filter dryer.
- E. Liquid Line Filter Dryer: Sealed container up to approximately 10 tons of capacity and replaceable desiccant dryer core and strainer on larger capacity systems.
- F. Charging Valves: Quick coupling type connection with removable valve core.

- G. Service Valves: Install liquid, suction and discharge line valves, all suitable for refrigerant used and location in the system, designed so as to be easily packed with pressure on the line and with wing caps that completely enclose valve stem. Install all purge valves, relief valves or other valves required for safe and proper operation of the system and as may be required by State or local codes. Detroit, Alco, Sporlan or Automatic Products approved substitute.

### **PART 3 EXECUTION**

#### **3.01 PIPE INSTALLATION**

- A. Air Conditioning Refrigeration Subcontractor: Submit 5 copies of piping diagram for approval. Install all refrigerant piping, major components and all minor components, such as dehydrator, service valves, etc., and arrange piping for hot gas bypass for low load operation. Test system, evacuate, charge, start-up and adjust. Refer to applicable sections of these Specifications for test, evacuation, etc.
- B. Piping Runs: Route piping close to and parallel with walls, overhead construction, columns and other structural and permanent-enclosure elements of the building. If not otherwise indicated, run piping in the shortest route which does not obstruct usable space or block access for servicing the building or equipment and avoid diagonal runs. Wherever possible in finished and occupied spaces, conceal piping from view. Do not encase horizontal runs in solid partitions.
- C. Refrigerant Piping:
  - 1. Use hard drawn copper tubing and make all changes in direction with specified fittings.
  - 2. Lay out the refrigerant piping system in a manner to prevent liquid refrigerant from entering the compressor and so that oil will return to the compressor. Slope all horizontal suction lines toward the compressor. Take special care to keep all tubing clean and dry.
  - 3. Install all refrigerant piping straight and free from kinks and restrictions, properly supported to minimize vibration. Provide hangers at 5' spacing for 1/2" lines, 6' spacing for 1" lines and 8' spacing for 1-1/2" and larger lines. Submit complete diagram for approval.
  - 4. Comply with the refrigerant piping installation instructions of the refrigeration equipment manufacturer.
  - 5. If line sets per 2.01, B are used they shall be installed plumb and supported per specifications or per manufacture recommendations (whichever is more restrictive) and follow building lines. Turns shall be made using appropriate bending tools. The installation shall have a workmanship like quality similar to the ACR type installation or it shall be modified or replaced per directions of Engineer.

#### **3.02 PIPING JOINTS**

- A. General: Provide joints of the type indicated in each piping system, and where piping and joint as manufactured form a system, utilize only that manufacturer's material.
- B. Braze Copper Tube and Fitting Joints: Where indicated, in accordance with ANSI/ASME B31.5. Pass a slow stream of dry nitrogen gas through the tubing at all times while brazing to eliminate formation of copper oxide.
- C. Changes in Direction: Use fittings for all changes in direction. Run lines parallel with building surfaces.
- D. Unions and Flanges: At all equipment to permit dismantling and elsewhere as consistent with good installation practice.
- E. Expansion: Provide loops, swing joints, anchors, runouts and spring pieces to prevent damage to piping or equipment.

#### **3.03 MISCELLANEOUS PIPING EQUIPMENT**

- A. Floor, Wall and Ceiling Plates: Chrome-plated pressed steel or brass screw locked split plates on all pipe penetrations in finished spaces.

- B. Filters: Install in a manner to permit access for removal and replacement of filter cartridge.

### **3.04 CLEANING**

- A. General: Clean all dirt and construction dust and debris from all mechanical piping systems and leave in a new condition. Touch-up paint where necessary.
- B. Refrigeration System Piping: If, for any reason, sanitized and sealed-at-the-mill tubing is not used, clean the tubing as follows:
  1. Wipe each tube internally with a dry, lintless cloth followed with a clean lintless cloth saturated with recommended refrigerant.
  2. Repeat until the saturated cloth is not discolored by dirt.
  3. Wipe with a clean cloth saturated with compressor oil and squeezed dry.
  4. Wipe with a dry, lintless cloth.

### **3.05 TEST**

- A. Comply with manufactures IOM directions.

**END OF SECTION**



**SECTION 23-3000  
AIR DISTRIBUTION**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

- A. Provide Air Distribution Materials as specified herein and as shown on the Drawings.
- B. Material characteristics and size shall be as indicated on the Drawings.
- C. Related Work: The requirements of Section 23 0500, Common HVAC Materials and Methods, also apply to this section.

**1.02 QUALITY ASSURANCE**

- A. Air Distribution Equipment Rating: In accordance with AMCA certified rating procedures and bearing the AMCA label.
- B. See Commissioning specification for additional requirements.

**1.03 SUBMITTALS**

- A. Submit catalog data, construction details and performance characteristics for all manufactured materials.
- B. Submit operating and maintenance data.
- C. For adhesives and sealants used on the interior of the building (inside the waterproofing system), include printed statement of volatile organic compound (VOC) content.

**PART 2 PRODUCTS**

**2.01 SHEET METAL**

- A. Sheet Metal Materials:
  - 1. General Material Requirements: Comply with the Mechanical Code and SMACNA'S "HVAC Duct Construction. Standards – Metal and Flexible, Third Edition" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
  - 2. All interior ducts shall be constructed with G-60 or better galvanized steel conforming to ASTM A653/A653M and A924/A924M Standards, LFG, chem treat. Exterior ductwork or duct exposed to high humidity conditions (that is: kitchen exhausts, etc.) shall be G-90 or better galvanized steel, conforming to ASTM A653/A653M and A924/A924M Standards, LFG, chem. treat.
  - 3. Stainless-Steel Sheets: Comply with ASTM A480/A480M, Type 304 or 316, and having a No. 2D finish for concealed ducts and No. 2B, No. 2D, No. 3 or No. 4 for exposed surfaces. **Stainless steel shall be used for outside air plenums and outside air ductwork until mixed with return air.**
  - 4. Aluminum Sheets: Comply with ASTM B209/B209M, Alloy 3003, H14 temper; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.
  - 5. Reinforcement Shapes and Plates: ASTM A36/A36M, steel plates, shapes, and bars; black and galvanized.
  - 6. Tie Rods: Galvanized steel, ¼ inch (6 mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8 inch (10 mm) minimum diameter for lengths longer than 36 inches (900 mm).
- B. Duct Fabrication requirements: Metal gauges, joints and reinforcement in accordance with Mechanical Code, ASHRAE and SMACNA standards. Ductwork shall be fabricated to the following pressure classifications:
  - 1. Return and exhaust ducts: 2 "negative.

2. Supply ducts from fan discharge to diffuser: 2" positive.
- C. Acoustical Duct Lining: **Not acceptable in OSA duct.** Line ducts with 1" thick lining (unless noted otherwise) for installation inside the building insulation envelope, and 1-1/2" for installation outside the building insulation envelope. Density shall be 3 lb / ft<sup>3</sup> minimum. Owens Corning, QuietR, or equal Schueller, or Certain Teed. Meeting NFPA 90A and B requirements for maximum flame spread and smoke developed. Duct liner adhesive shall conform to ASTM C916. Mechanically attach lining to sheet metal duct with fasteners conforming to SMACNA Standard MF-1-1971, Schuller Grip Nails or Gramweld welding pins. Apply fire-retardant type adhesive similar to Schuller No. 44 adhesive, Benjamin Foster 81-99, Insul-Coustic 22 or 3M equivalent on all leading edges, joints and seams.
- D. Duct Tapes, Sealants, Adhesives & Gaskets:
1. Aluminum bonded to aluminized mylar reinforced with fiberglass mesh backing an elastomeric pressure sensitive adhesive specifically formulated for adhesion to galvanized metal. Hardcast AFG-1402 or accepted substitute.
  2. Two-part sealing system with woven fiber, mineral gypsum impregnated tape and non-flammable adhesive. Hardcast "DT" tape and "FTA-20" adhesive, United "Uni-Cast" system, or accepted substitute.
  3. For joints and seams exposed to the weather in lieu of soldering, United "Uni-Cast" system or approved.
  4. Joint & Seam Sealants (Water Based): Flexible, adhesive sealant, resistant to UV light when cured, UL 723 listed, and complying with NFPA requirements for Class 1 ducts.
  5. Joint & Seam Sealants (Solvent Based): Flexible. Non sag, solvent-release-curing, for use in low temperature applications. Shall be resistant to UV light and shall be UL 723 Listed and meet NFPA requirements for Class 1 ductwork.
  6. Flange Gasket: Butyl rubber or EPDM polymer which complies with UL standard 181 and 723 testing. The gasket shall not contain vegetable oils, fish oils, or any other type of material that will support fungal and/or bacterial growth.
  7. Liner Adhesive: Water based, fire and moisture resistant, used to adhere insulation to metal duct. It shall comply with NFPA 90A and UL 723 requirements.
  8. Duct Liner Sealant: Water based sealant, fire and moisture resistant, used to encapsulate fiberglass duct insulation to eliminate airborne fibers. Must comply with UL requirements.
- E. Optional Duct Joints for Sheet Metal Ducts: Prefabricated slide-on transverse duct connectors will be accepted. Duct constructed using prefabricated connection systems will refer to the manufacturer guidelines for sheet gage, intermediate reinforcement size and spacing, and proper joint reinforcements. "Ductmate System" by Ductmate Industries, Inc., Ward Duct Connectors, Inc., Mez Industries, Elgen, or acceptable substitute. Spiramir self-sealing round duct connector system meeting Class 3 leakage standards with EPDM o-ring seal.
- F. Exterior and Roof Mounted Ductwork: Construct roof mounted ductwork and other ductwork exposed to outside weather of stainless steel outer jacket, two gauges heavier than equivalent ductwork with all joints soldered in a weather-proof manner with 2" of internal duct lining. Where indicated, provide an inner galvanized steel liner sealed against moisture. Submit shop drawings.
- G. Exposed to View Spiral Seam Duct: Round and flat oval spiral seam duct shall be manufactured of galvanized steel sheet metal with spiral lock seam. Sizes up to 36" diameter or 36" wide shall be 22 gauge; sizes over 36" shall be 20 gauge. Reinforcement or bracing shall be as detailed on the Drawings. Matching fittings shall be manufactured of galvanized steel with continuous welded seams. Fittings up to 36" diameter or width shall be 20 gauge, fittings larger than 36" shall be 18 gauge.
- H. Concealed Round Duct: Round and flat oval spiral seam duct shall be manufactured of galvanized sheet metal with spiral lock seam. Construction, gauges, and reinforcement in accordance with SMACNA standards. Fittings shall be manufactured of galvanized steel with spot welded or riveted and sealed seams or continuously welded seams. Snap lock longitudinal seam duct shall fully comply with SMACNA standards for duct gauge and seam type for appropriate pressure class. Adjustable elbows are prohibited.

- I. Flexible Ductwork-Low Pressure: Insulated low pressure flexible duct, factory fabricated assembly consisting of a zinc-coated spring steel helix seamless inner liner, wrapped with a nominal 1" thick insulation for installation inside the building insulation envelope, and 1-1/2" for installation outside the building insulation envelope, 1 pound/cubic foot density fiberglass insulation. The assembly shall be sheathed in a vapor barrier jacket, factory vapor resistance sealed at both ends of each section. The composite assembly, including insulation and vapor barrier, shall meet the Class 1 requirements of NFPA Bulletin No. 90-A and be labeled by Underwriters Laboratories, Inc., with a flame spread rating of 25 or less and a smoke developed rating of 50 or under. The duct shall have factory sealed double air seal (interior and exterior) to assure an airtight installation. Genflex, ATCO, Wiremold, Thermaflex, Glassflex, Clevepak, Schuller, or accepted substitute.

## 2.02 ACCESSORIES

- A. Manual Volume Dampers: Construct of material two gauges heavier than duct in which installed; single plate up to 12" wide; multiple over 12" wide. Hem both edges 1/2" and flange sides 1/2". Use Young, Duro-Dyne, MAT, or accepted substitute damper accessories. Young numbers are shown.
  1. No. 605 bearing set with No. 403 regulator for dampers up to 24" long.
  2. For dampers over 24" long use No. 660 3/8" rod, No. 656 end bearing and No. 403 regulator.
  3. Where damper regulators are not readily accessible, use No. 660 or No. 661 rod extensions and No. 301 and No. 315 concealed damper regulators or MAT cable operated dampers as required.

Location of all volume dampers is not necessarily shown on Drawings; minimum required is one in each supply, return or exhaust main, and one in each branch.
- B. Exterior Wall Louvers: Prefabricated extruded aluminum stormproof blades with frame to suit building construction. 1/2", 16 gauge aluminum wire mesh on back side of all intake louvers and insect screen on exhaust/relief louvers. 4" deep, 37½ degree fixed drainable type blade, AMCA 500 tested for 800 fpm without water penetration, and maximum of 0.07" wg intake pressure loss and 0.09" wg exhaust pressure loss. Provide 70% PVDF protective coating in color selected by Architect, and stainless steel fasteners. Ruskin ELF375X as basic pattern on blade and frame, Greenheck, Cesco, Pottorff, or approved. Louvers shall be coated for seashore applications.
- C. Standard Gravity Exhaust Intake Heads:
  1. Aluminum cap with backdraft dampers on relief only, curb connection, flashing, 1/2" mesh galvanized bird screen and hinged access. Greenheck, Carnes, Cook or accepted substitute.
  2. Install with automatic relief / outside air intake damper in curb as indicated on the Drawings.
- D. Louvered Gravity Exhaust Head / Outside Air Intake Housing: Extruded aluminum (0.0081) louvered tiered style with curb connection, flashing, 1/2" mesh bird screen. Cap color as selected by Architect. Provide with storm proof blades with aluminum construction and Kynar finish. Color as selected by Architect from standard color palette. See drawings for required performance and custom height/number of louver tiers. Greenheck WIH/WRH as basis of design. Equal Ruskin, Cook, or Carnes approved.
- E. Locking Connection Straps: 1/2" wide positive locking steel straps or nylon self-locking straps. Panduit or accepted substitute.
- F. Connection Fittings: Connections to non-metallic ducts manufactured sheet metal "spin-in" fittings. Genflex, Wiremold, Thermaflex, Glassflex, Clevepak, Schuller, or accepted substitute.
- G. Access Doors In Sheet Metal Work:

1. Hollow core double construction of same or heavier gauge material as duct in which installed. Use no door smaller than 12" by 12" for simple manual access or smaller than 18" by 24" where personnel must pass through infrequently. Use 24" by 60" minimum for filters and more frequent maintenance. Use Ventlok or accepted substitute hinges and latches on all doors.
    - a. 100 Series hinges and latches on low pressure system doors up to 18" maximum dimension.
    - b. 200 Series on larger low pressure system doors and 333 Series on high pressure systems.
  2. Construct doors up to 18" maximum dimension with 1" overlap, furr and gasket with 3/4" by 1/8" sponge rubber. Fit larger doors against 1-1/2" by 1/8" or angle frame and gasket with 3/4" by 1/8" sponge rubber or felt.
- H. Anti-Backdraft Dampers: Connected, gasket-edged aluminum blades set in 14 gauge or heavier steel frame; brass, nylon or Teflon bearings; equip with spring helper with tension adjustment feature or with adjustable counterweight and adjust to open when not more than 0.10" wg pressure is applied. Ruskin CBS-4, Greenheck, Pacific Air Products, Air Balance, Controlair or accepted substitute.
- I. Opposed Blade Volume Damper: Install opposed blade volume damper in each zone supply duct on discharge of multi-zone units and where indicated on Drawings. Young No. 817 or accepted substitute.
- J. Flexible Connections: Neoprene impregnated fiberglass connection. Ventglass, Duro-Dyne, or accepted substitute.
- K. Control Dampers: Construct of aluminum frame and aluminum airfoil blades with axle shafts and/or operating "jackshafts" with interconnecting blade linkages in the side channels of the frame to provide coordinate tracking of all blades. Interlocking multi-blade type, except where either dimension is less than 6", a single blade may be used. Opposed blade type on all modulating dampers and parallel blades on all two position dampers. Provide with stainless steel, silicone, or vinyl jamb seal and vinyl or silicone blade seals. Damper assembly rated for maximum air leakage of 3 CFM per square foot at 1" wg pressure or less. Performance rating for the damper shall be tested under the AMCA Certified Ratings Program. Greenheck VCD-40, Ruskin CD 50, CESCO AAA or AAB, or TAMCO Series 1000. **Control dampers shall be constructed with stainless steel linkage and anodized aluminum blades and frame, when installed in outside air duct.**

### 2.03 GRILLES, REGISTERS AND DIFFUSERS

- A. Description: Provide grilles, registers and diffusers as shown on the Drawings.
- B. Finishes:
  1. Steel: Flat white enamel prime coat, factory applied on ceiling diffusers. Others are to have a baked enamel finish, color as selected by Architect.
  2. Aluminum: Anodized clear finish unless indicated otherwise.
- C. Manufacturers: Carnes, Krueger, Titus, Price, Nailor, and Tuttle & Bailey are accepted substitutes where only Titus model numbers are listed. Where other manufacturer's products are listed and/or "accepted substitute" is indicated, only the products or an accepted substitute for that item shall be provided.
- D. Ceiling Return and/or Exhaust Register: Perforated snap-in or concealed hinged face plate. Use in spaces containing ceiling diffusers and/or T-bar ceilings. Provide with damper except where dampered plenums are indicated. Match manufacturer of supply. E3 is 12x12 face. R4 is 48x24 face.
- E. Sidewall Supply Grille or Register: Double deflection grille with face bars parallel to long dimension on ceiling type and horizontal on wall type; bars to be individually adjustable, spaced on 0.66" to 0.75" centers; key operated opposed blade volume damper. Titus 300RL.

- F. Modular Core Ceiling Diffusers: 1 to 4-way pattern control. Pattern of distribution as indicated. Provide with opposed blade volume dampers and frame for unit as required. Titus MCD.
- G. Sidewall or Ceiling Return or Exhaust Register: Face bars parallel to long dimension on ceiling type and horizontal on wall type; bars set at 35 degrees to 45 degrees, spaced on 0.66" to 0.75" centers; key operated opposed blade volume damper. Titus 350RL Series.
- H. Heavy Duty, Adjustable Bars Low Return Grille: All welded construction with heavy 14 gauge, adjustable round edge steel horizontal face bars at 1/2" on centers and reinforced every 6" to 8". Titus 33 Series.
- I. Steel Door Transfer Grilles and Sidewall Transfer grilles: All welded construction with 20 gauge, fixed inverted V-blades with a deflection angle of 77 so as to provide a sight proof design.
- J. Plaster Frames: Provide plaster frames for all diffusers, grilles or registers installed in plaster walls or ceiling. Where register face is aluminum, the plaster frame shall be aluminum. Frame to match manufacturer of register or be of compatible size of listed manufacturer. Titus TRM/TRM-S.

### **PART 3 EXECUTION**

#### **3.01 EQUIPMENT INSTALLATION**

- A. Air Handling Equipment Installation and Arrangement: Install and arrange as shown on Drawings. Comply with the manufacturer's recommendations for installation, connection, and start-up.
- B. Equipment Access Panels: Locate free of all obstructions such as ceiling bars, electrical conduit, lights, ductwork, etc.
- C. Filters: Install specified filters or accepted substitute temporary construction filters in supply units and systems prior to start-up or use for drying and/or temporary heat. Replace prior to acceptance of project.

#### **3.02 INSTALLATION OF GRILLES, REGISTERS AND DIFFUSERS**

- A. Size and air handling characteristics shall be as shown on the Drawings.
- B. Locate, arrange, and install grilles, registers and diffusers as shown on the Drawings. Locate registers in tee-bar ceilings with diffusers centered on the tile unless indicated otherwise.

#### **3.03 DUCTWORK INSTALLATION**

- A. Support: Install ductwork with 1" wide strap cradle hangers not more than 8' on centers or as required by code. Support terminal units independent of adjacent ductwork. Attach to available building construction according to good practices for materials involved. Manufactured hanger system acceptable in lieu of fabricated hangers at Contractor's option. Ductmate "Clutcher" system or approved. Support flexduct where shown to be used for lengths beyond 4' per above requirements. Comply with SMACNA Duct Construction Standard Figure 3-9 and 3-10.
- B. Fan and Air Handling Unit Flexible Connections: Install neoprene impregnated fiberglass connections in ductwork at all rotating equipment. Ventglass, Duro-Dyne or accepted substitute.
- C. Elbows and Fittings: Construct elbows with throat radius equal to duct width in plane of turn or make them square and provide double wall, air foil turning vanes.
- D. Fittings: Make transitions and take-offs as shown on Drawings. Provide volume dampers and splitter dampers as indicated on Drawings and as specified. Saddle tees are not allowed.
- E. Acoustical Duct Lining:

1. Acoustically line all fan unit intake and discharge plenums, all ductwork indicated as lined on the Drawings, all sheet metal ductwork specified per Section 23 0700 as insulated, where exposed to view or subject to damage in areas such as mechanical rooms, and, at the Contractor's option, all insulated ductwork specified in Section 23 0700 except outside air intake ducts. The duct size noted on the Drawings is the clear opening of the duct with insulation. Insulation shall not reduce duct size listed.
  2. All duct designated to receive duct liner shall be completely covered with a fire-resistant, fiber-bonding coating, or covering (composite, polymer, vinyl or neoprene) that reduces airflow resistance and controls fiber release. The duct lining shall be adhered to the sheet metal with 100% coverage of a fire retardant adhesive. The coated surface of the duct liner shall face the airstream. When width of duct exceeds 12" and also when height exceeds 24", use corrosion resistant mechanical fasteners 12" on center maximum lateral spacing and 18" on center maximum longitudinal spacing. Start fastening within 3" of upstream transverse edge of the liner and within 3" of the longitudinal joint. Mechanical fasteners shall be either impact-driven or weld-secured and shall not pierce the duct walls. Fasteners and washers of the specified type and length shall be used assuring no greater than 10% compression of the liner thickness. Installation shall be made so that no fastener pins protrude into the airstream. No gaps or loose edges shall occur in the insulation. Top pieces shall be supported by the side pieces. Provide insulated build out frames for attaching dampers at running vanes where required.
  3. All transverse and longitudinal abutting edges of duct lining shall be sealed and lapped 3" with a heavy coat of approved adhesive, in accordance with the manufacturer's recommendations. All upstream transverse edges shall be installed with sheet metal nosings. All raw exposed edges of lining shall be 'battered' with approved adhesive.
- F. Manual Volume Dampers: Location of all volume dampers are not necessarily shown on the Drawings. Provide a minimum of one volume damper in each supply, return or exhaust branch. Do not install dampers closer than 3 duct diameters to the diffuser.
- G. Duct Insulation: Specified in Section 23 0700.
- H. Sleeves: Provide galvanized sheet metal plaster ring around ductwork penetrating exposed finished walls. Sleeve and flash all duct penetrations through exterior walls in an air tight and weatherproof manner.
- I. Plenums: Construct sheet metal plenums and partitions of not lighter than 18 gauge galvanized steel and reinforce with 1-1/2" by 1/2" by 1/8" angles as required to prevent drumming or breathing.
- J. Access: Install necessary access opening and covers for cleaning, wiring or servicing motors, filters, fans, both entering and leaving air sides of coils, fire and/or smoke dampers and to other equipment located within or blocked by sheet metal work.
- K. Sealing: Caulk, seal, grout and/or tape ductwork and plenums to make airtight at seams, joints, edges, corners and at penetrations. Solder all seams, joints, etc., on all ductwork exposed to the weather. Install specified tape in accordance with manufacturer's requirements using degreaser on surfaces to be taped and wiped to eliminate moisture.

### **3.04 FIELD QUALITY CONTROL**

- A. Disassemble, reassemble, and seal segments of systems as required to accommodate leakage testing and as required for compliance with test requirements.
- B. Conduct test, in presence of Architect, at static pressures equal to maximum design pressure of system or section being tested. If pressure classifications are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing.
- C. Determine leakage from entire system or section of system by relating leakage to surface area of test section.

- D. Maximum Allowable Leakage: Comply with requirements for Leakage Classification 3 for round and flat-oval ducts, Leakage Classification 12 for rectangular ducts in pressure classifications less than and equal to 2-inch wg (both positive and negative pressures).
- E. Remake leaking joints and retest until leakage is less than maximum allowable.
- F. Leakage Test: Perform tests according to SMACNA's "HVAC Air Duct Leakage Test Manual."

### **3.05 NEW DUCTWORK CLEANING**

- A. Store all ductwork materials on pallets or above grade, protected from weather, dirt/mud and other construction dust.
- B. Remove all accumulated dust, dirt, etc. from each duct section as it is being installed.
- C. Prior to installation of diffusers, grilles and registers, install temporary system filters and cover all diffuser, grille and register openings with temporary 25% efficiency filter materials and start the fan systems. Operate fans a minimum of 8 hours. Remove all temporary filters at the end of that period.
- D. Clean all diffusers, grilles and registers just prior to project final completion.
- E. Cover all ductwork terminations during construction to prevent accumulation of dust and debris.

**END OF SECTION**

BLANK PAGE



**SECTION 23-3400  
HVAC FANS**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

- A. Provide Fans as specified herein and shown on the Drawings.
- B. Equipment capacity and size as indicated in the equipment lists on the Drawings.
- C. Related Work: The requirements of Section 23 0500, Common HVAC Materials and Methods, also apply to this section.

**1.02 QUALITY ASSURANCE**

- A. Air Handling Equipment: Rated in accordance with AMCA certified rating procedures and AMCA labeled.
- B. See Commissioning specification for additional requirements.

**1.03 SUBMITTALS**

- A. Submit catalog data, construction details and performance characteristics for each fan.
- B. Submit operating and maintenance data.

**PART 2 PRODUCTS**

**2.01 EXHAUST FANS**

- A. Roof Mounted Exhaust Fan (Direct Drive): Curb mounted on roof; vertical shaft, direct driven, open BI wheel as shown on Drawings with permanently lubricated sealed ball bearings; fan duty motor; bird screen; weatherproof aluminum housing for mounting on square base; capacity as indicated on Drawings. Motor located outside the air stream. Casing to be easily removed for service. Motor and fan assembly to be mounted on rubber vibration isolators. Where indicated on the Drawings, provide backdraft damper or motorized damper Provide factory mounted disconnect and 14" tall curb to match roof slope. Provide with EC motor where listed on schedule. Motor shall accept external analog signal or be provided with integral device to manually adjust speed as listed on schedule. Greenheck G, as Basis of Design, Carnes, Cook, Twin City, or approved.
- B. Utility Set Exhaust Fan: AMCA rated and construction of wheel inclination, arrangement, rotation discharge, outlet velocity, tip speed and capacity as scheduled on the Drawings. Mount motor on adjustable base; pressure gun lubricated ball or roller bearings for both fan and motor. Provide with aluminum weather proof housing where located outside. Provide with aluminum construction. Trane, Utility, Cook, PennBarry, Carrier, Greenheck, Peerless, Acme, Twin City, Captiveaire, or approved.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install and arrange equipment as shown on the Drawings and as recommended by the equipment manufacturer.

**3.02 AIR HANDLING INSTALLATION**

- A. Installation and Arrangement: Air handling equipment shall be installed and arranged as shown on the Drawings. Comply with the manufacturer's recommendations for installation connection and start-up.

- B. Train Owner's maintenance personnel to adjust, operate and maintain the entire unit. Refer to Division 01 Section Closeout Procedures and Demonstration and Training.

### **3.03 CONTROLS**

- A. Wiring: All wiring shall be in accordance with the National Electrical Code and local electrical codes.

**END OF SECTION**

**SECTION 23-4000  
HVAC AIR CLEANING DEVICES**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

- A. Provide Air Cleaning Devices as specified herein and as shown on the Drawings.
- B. Materials characteristics and size shall be as indicated on the Drawings.
- C. Related Work: The requirements of Section 23 0500, Common HVAC Materials and Methods, also apply to this section.

**1.02 QUALITY ASSURANCE**

- A. Air Equipment Rating: In accordance with ASHRAE 52.2-2007.

**1.03 SUBMITTALS**

- A. Submit catalog data, construction details and performance characteristics for all manufactured materials.
- B. Submit operating and maintenance data.

**PART 2 PRODUCTS**

**2.01 AIR FILTERS**

- A. Disposable Media, MERV 8 Rated:
  - 1. Disposable, preformed 100% synthetic non-woven media, pleated 2" thick cartridge type with carrier board frames with diagonal and horizontal supports. Average ASHRAE test efficiency of MERV 8 per ASHRAE 52.2-2007 App J with initial pressure drop across the clean filter bank not exceeding 0.2" W.C. when operating at 500 FPM. The filter media shall have an Underwriters Laboratories UL 900 Class 2 listing.
  - 2. Provide specified filters for temporary heat and testing during construction and replace filters with new clean, specified filters prior to acceptance of project by Owner (two complete sets of media are required).
  - 3. Flanders or equal Farr.
- B. Disposable Media, MERV 13 Rated:
  - 1. Disposable, preformed 100% synthetic non-woven media, pleated 4" thick cartridge type with carrier board frames with diagonal and horizontal supports. Average ASHRAE test efficiency of MERV 13 per ASHRAE 52.2-2007 App J with initial pressure drop across the clean filter bank not exceeding 0.4" W.C. when operating at 500 FPM. The filter media shall have an Underwriters Laboratories UL 900 Class 2 listing.
  - 2. Flanders or equal Farr.

**2.02 AIR FILTER HOUSINGS**

- A. Single-Stage V-Bank Filter Housing:
  - 1. Construction: 16-gauge galvanized steel with pre-drilled standing flanges and dual access doors.
  - 2. UV-resistant door knobs, door and filter sealing gasketing.
  - 3. Filters: 4" deep MERV 13 filter.
  - 4. Camfil Vee-bank series or approved.
- B. Dual-Stage V-Bank Filter Housing:
  - 1. Construction: 16-gauge galvanized steel with pre-drilled standing flanges and dual access doors.
  - 2. UV-resistant door knobs, door and filter sealing gasketing.
  - 3. Filters: 2" MERV 8 filter and 4" MERV 13 filter.
  - 4. Camfil Vee-bank series or approved.

## **2.03 AIR FILTER SYSTEM ACCESSORIES**

- A. Filter Gauge Filter Gauges: Dwyer 2000-AF Series or accepted substitute, across each filter bank or combination of filter banks when located in the same AHU or filter frame. Mount gauge securely at a point free of vibration.

## **PART 3 EXECUTION**

### **3.01 EQUIPMENT INSTALLATION**

- A. Air Handling Equipment Installation and Arrangement: Install and arrange as shown on Drawings. Comply with the manufacturer's recommendations for installation, connection, and start-up.
- B. Equipment Access Panels: Locate free of all obstructions such as ceiling bars, electrical conduit, lights, ductwork, etc.
- C. Filters: Install specified filters or accepted substitute temporary construction filters in supply units and systems prior to start-up or use for drying and/or temporary heat. Provide 1 additional set of filters and replace those installed during Balancing and Commissioning process.
- D. Install and arrange equipment as shown on the Drawings and as recommended by the equipment manufacturer.

**END OF SECTION**

**SECTION 23-7400  
PACKAGED HVAC UNITS**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

- A. Provide Heating, Cooling, and Ventilating Equipment as specified herein and shown on the Drawings.
- B. Equipment capacity and size shall be as indicated on the Drawings.
- C. Related Work: The requirements of Section 23 0500, Common HVAC Materials and Methods, also apply to this section.

**1.02 QUALITY ASSURANCE**

- A. Air Handling Equipment: Rated in accordance with AMCA certified rating procedures and AMCA labeled.
- B. Air Conditioning and Refrigeration Equipment Rating: Rated in accordance with ARI certified rating procedures and ARI labeled.
- C. Gas-fired Equipment: Design certified by American Gas Association.

**1.03 SUBMITTALS**

- A. Submit catalog data, construction details and performance characteristics for each HVAC unit.
- B. Submit operating and maintenance data.

**PART 2 PRODUCTS**

**2.01 HVAC UNITS**

- A. Air-To-Air, Electric Roof-Mounted Heat Pumps:
  - 1. Acceptable Manufacturers: Carrier, McQuay, Trane, York, or approved.
  - 2. Size and capacity as shown on the Drawings.
  - 3. Coils shall be constructed of aluminum plate fins mechanically bonded to non-ferrous tubing with all joints brazed. Supply fan shall be centrifugal type, direct or belt driven by a permanent lubricated motor.
  - 4. Unit shall include hermetically sealed compressor with automatically reversible oil pump, internal or external motor protection. Outdoor fans shall be vertical discharge propeller type, direct driven by permanently lubricated motor. Include electric resistant heat section and 1" throw-away type air filters. Controls and devices shall include a high pressure stat, two low pressure stats, crankcase heater, suction line accumulator, pressure relief device, a positive acting timer to prevent compressor short cycling and to prevent compressor from restarting for a five-minute period if power is interrupted, and an automatic defrost control to accomplish defrosting (only if required) every 90 minutes for a period of not more than 10 minutes.
  - 5. Mount unit on leveled factory furnished steel support curb with ductwork and electrical connections brought up through the roof within the curb. **For RTU-2, provide 24 high plenum curb, CDI or approved equal.**

6. Controls: Heat pump manufacturer shall provide factory installed and wired controls including control circuit transformers, relays, all necessary internal circuiting and fused disconnects for a single field electrical power connection, switches, controllers and thermostats requiring only field mounting of thermostats and low voltage wiring from thermostats to unit to place in operation. Arrange controls to operate the supply fans from programmable 7-day night set back thermostat. Cycle heating and cooling from room thermostats to maintain space temperature. Unit shall have one stage of cooling and three stages of heat (one heat pump cycle and two electric resistance) and also have an outdoor thermostat lock-out to prevent operation of the second stage of electric resistance heat above 35 degrees F (Unit shall have one stage of cooling and two stages of heat, one heat pump and one electric resistance).

## **2.02 SPLIT SYSTEM HVAC UNITS**

- A. Split System Heat Pump:
  1. Acceptable Manufacturers: Carrier, Lennox, Trane, or approved.
  2. Indoor Section: Factory fabricated unit in steel cabinet with centrifugal fan, filters, indoor coil section constructed of aluminum plate fins bonded to non-ferrous tubing with all joints brazed, integral electric resistant heaters, refrigerant metering device and indoor fan relay.
  3. Outdoor Section: Capacity matched with indoor section, steel cabinet with scroll compressor, automatically reversible oil pump, internal/external motor protection, outdoor propeller fan with direct drive motor. Puron refrigerant.
  4. Controls and Protective Devices: Minimum accessories shall include high pressure stat, two low pressure stats, crankcase heater, suction line accumulator, pressure relief device, motor compressor thermal and current sensitive overload devices, positive acting timer to prevent short cycling on power failure, head pressure controller for low ambient operation, suspension hardware for horizontal installation, precharged and insulated refrigerant tubing with quick couplers. In addition, programmable 7-day, night setback thermostat/controller with automatic minimum outside air dampers provided by the unit manufacturer. Honeywell Vision Pro 8000 with Honeywell JADE controller or factory furnished economizer/minimum outside air controller shall be furnished for each unit. . Outside air dampers shall be closed on fan shutdown and be in minimum position when heat pump is set to occupied mode by the Honeywell Pro 8000.
  5. Unit shall be ARI certified and UL labeled.
  6. Economizer: Factory assembled and insulated outside air intake, relief and return air housing with automatic dampers for economizer operation. Assembly shall fit the HVAC unit specified above and shall be furnished complete with damper operators, bird screen over intake and relief air dampers.
  7. Economizer Logic Controller: Where units with CO2 (DCV) and economizer control are shown, provide solid state economizer logic module to proportion outdoor and return air dampers to control for "free" cooling. Honeywell W7215A/B or equal.
  8. Coat units for coastal application.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install and arrange equipment as shown on the Drawings and as recommended by the equipment manufacturer.
- B. Piping: Refer to applicable sections for piping, ductwork, insulation, painting, etc.

### **3.02 AIR HANDLING INSTALLATION**

- A. Installation and Arrangement: Air handling equipment shall be installed and arranged as shown on the Drawings. Comply with the manufacturer's recommendations for installation, connection, and start-up.
- B. Lubrication: All moving and rotating parts shall be lubricated in accordance with the manufacturer's recommendations prior to start-up.
- C. Filters: Specified filters or approved temporary construction filters shall be installed in supply units prior to start-up or used for drying and/or temporary heat.

### **3.03 SMOKE DETECTOR INSTALLATION**

- A. Provide duct-mounted smoke detectors at air handling units in accordance with Code requirements.
- B. Where detectors are mounted in a concealed location, provide remote indicating panel located as directed.
- C. Automatic Smoke Detector Fan Shutdown: Coordinate with Automatic Temperature Controls specified elsewhere in these specifications.

### **3.04 CONTROLS**

- A. Wiring: All wiring shall be in accordance with the National Electrical Code and local electrical codes.
- B. Mounting: All controls intended to be operable by the occupants shall be mounted with the operating portion no more than 46" above the floor or as otherwise required by applicable codes.

**END OF SECTION**

BLANK PAGE



**SECTION 23-8000  
TERMINAL HVAC EQUIPMENT**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

- A. Provide Heating, Cooling, and Ventilating Equipment as specified herein and shown on the Drawings.
- B. Equipment capacity and size shall be as indicated on the Drawings.
- C. Related Work: The requirements of Section 23 0500, Common HVAC Materials and Methods, also apply to this section.

**1.02 QUALITY ASSURANCE**

- A. Air Handling Equipment: Rated in accordance with AMCA certified rating procedures and AMCA labeled.
- B. Air Conditioning and Refrigeration Equipment Rating: Rated in accordance with ARI certified rating procedures and ARI labeled.
- C. See Commissioning specification for additional requirements.

**1.03 SUBMITTALS**

- A. Submit catalog data, construction details and performance characteristics for each HVAC unit.
- B. Submit operating and maintenance data.

**PART 2 PRODUCTS**

**2.01 SMALL PACKAGED HVAC UNITS**

- A. Ducted, Split System Heat Pump Unit:
  - 1. Ducted Fan Coil:
    - a. Operable with R410A refrigerant, equipped with an electronic expansion valve, for installation into the ceiling cavity equipped with an air panel grille. It shall be a four-way air distribution type, ivory white, impact resistant, and washable decoration panel. The supply air is distributed via motorized louvers which can be horizontally and vertically adjusted from 0° to 90°. Computerized PID control shall be used to maintain room temperature within 1°F. The indoor units sound pressure shall range from 28 dB(A) to 33 dB(A) at low speed measured at 5 feet below the unit.
    - b. Performance: Each unit's performance is based on nominal operating conditions. See Drawings for required capacity.
    - c. Indoor Unit:
      - 1) Unit shall have horizontal supply air discharge outlets and a return air inlet.
      - 2) Unit shall be equipped with factory installed temperature thermistors for :
        - a) Return air
        - b) Refrigerant entering coil
        - c) Refrigerant leaving coil
      - 3) Unit shall have a factory assembled, piped and wired electronic expansion valve (EEV) for refrigerant control.
    - d. Fan:
      - 1) The fan shall be direct-drive turbo fan type with statically and dynamically balanced impeller with high and low fan speeds available.
      - 2) The airflow rate shall be available in high and low settings.
      - 3) The fan motor shall be thermally protected.
      - 4) Include optional self-cleaning filter system.

- e. Filter: The return air shall be filtered by means of a washable long-life filter with mildew proof resin. Provide two sets to allow Owner change-out without washing filter in unit.
  - f. Coil:
    - 1) Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
    - 2) The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
    - 3) The coil shall be a 2 row cross fin copper evaporator coil with 17 FPI design completely factory tested.
    - 4) The refrigerant connections shall be flare connections and the condensate will be 1 -1/4 inch outside diameter PVC.
    - 5) A condensate pan shall be located under the coil.
    - 6) A condensate pump with a 21 inch lift shall be located below the coil in the condensate pan with a built in safety alarm.
    - 7) A thermistor will be located on the liquid and gas line.
  - g. Control: The unit shall have controls provided to perform input functions necessary to operate the system. See Section 4 for more detail.
  - h. Electrical: This unit shall use controls provided by manufacturer of indoor/outdoor equipment to perform functions necessary to operate the system. Provide with wired wall sensor and contacts for enable/disable from BAS.
2. Outdoor Section: Capacity matched with indoor section, steel cabinet with hermetically sealed compressor, accumulator, crankcase heater, high and low pressure switches, restart delay relay, and propeller fans.
  3. Refrigerant Piping: See Section 23 2300.
  4. Unit shall be R-410A.
  5. Provide with integral condensate pump.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install and arrange equipment as shown on the Drawings and as recommended by the equipment manufacturer.
- B. Piping: Refer to applicable sections for piping, ductwork, insulation, painting, etc.
- C. Manufacturer's Field Service: Engage a factory authorized service representative to inspect field assembled components and equipment installation, to include electrical and piping connections. Report results to A/E in writing. Inspection must include a complete startup checklist to include (as a minimum) the following: Completed Start-Up Checklists as found in manufacturer's IOM.
- D. Engage a factory authorized service representative to perform startup service. Clean entire unit, comb coil fins as necessary and clean filters. Measure and record electrical values for voltage and amperage. Refer to Division 23 "Testing, Adjusting and Balancing" and comply with provisions therein.
- E. Engage a factory authorized service representative to train Owner's maintenance personnel to adjust, operate and maintain the unit. Refer to Division 01 Section Closeout Procedures and Demonstration and Training.

### **3.02 AIR HANDLING INSTALLATION**

- A. Installation and Arrangement: Air handling equipment shall be installed and arranged as shown on the Drawings. Comply with the manufacturer's recommendations for installation connection and start-up.
- B. Lubrication: All moving and rotating parts shall be lubricated in accordance with the manufacturer's recommendations prior to start-up.
- C. Filters: Specified filters or approved temporary construction filters shall be installed in supply units prior to start-up or used for drying and/or temporary heat.

### **3.03 CONTROLS**

- A. Wiring: All wiring shall be in accordance with the National Electrical Code and local electrical codes.

**END OF SECTION**

BLANK PAGE

**SECTION 26 0500**  
**BASIC ELECTRICAL MATERIALS & METHODS**

**PART 1 - GENERAL**

**1.01 Description**

- A. Furnish labor, supervision, permits, materials and equipment to complete the work required in Division 26 and by the contract documents.
- B. It is the intention of this Section of the Specifications and the accompanying drawings to describe and provide for the furnishing, installing, testing and placing in satisfactory and successful operation all equipment, materials, devices and necessary appurtenances to provide a complete electrical system, together with such other miscellaneous installations and equipment hereinafter specified and/or shown on the Plans.

**1.02 Contract Documents**

- A. The Contract Documents are complimentary, and what one affecting this Division requires shall be binding as if repeated herein.
- B. Separation of this Division from other Contract Documents shall not be construed as complete segregation of the work.
- C. Electrical work shall include both this Division as well as other Divisions as applicable, such as:
  - 1. Division 27, Communications
  - 2. Division 28, Safety & Security
  - 3. Division 33, Utilities.

**1.03 Codes**

- A. Meet requirements of State of Oregon Electrical Specialty Code, Oregon Administrative Rules Chapter 437, American Society of Testing and Materials (ASTM) Federal Specifications, American National Standards Institute (ANSI), National Electrical Manufacturers Association (NEMA), National Fire Protection Association (NFPA), Underwriters Laboratory (UL), National Electrical Code, National Electrical Safety Code, all rules and regulations of the local serving utility, National Board of Fire Underwriters and Oregon Structural Specialty Code. All Codes, rules, and regulations shall be the current or latest edition adopted by authorities having jurisdiction at time of permit.
- B. Code requirements shall be considered a minimum guide for the work. Where contract documents require work materials in excess of Code minimum, install work as called for in contract documents.

**1.04 Permits, Licenses And Taxes**

- A. The Contractor shall obtain and pay for all licenses, permits and inspections required by laws, ordinances and rules governing work specified herein. The Contractor shall arrange for inspection of work by the inspectors and shall give the inspectors all necessary assistance in their work of inspection. Division 26 Contractor shall make all necessary arrangements for installation of electrical services indicated on plans.
- B. Utility installation fees will be paid by the Owner.

**1.05 Layout And Coordination**

- A. See General Conditions.
- B. Before starting work, carefully examine Architectural, Civil, Landscape, Structural, Plumbing, Heating, Ventilating and Air Conditioning Drawings to become thoroughly familiar with conditions governing work on this project. Verify elevations, measurements, rough-in requirements of equipment and its installation location before proceeding with the work. Install equipment with access as required by NEC.
- C. Composite Interference Drawings. Before any sleeves or inserts are set or any electrical equipment or foundations are installed, prepare and submit for approval, by the Engineer, in accordance with the

General Provisions, composite coordination drawings for all equipment rooms, spaces and other areas in which the probability of interference exists. Drawings shall show the work of all trades covered, shall be drawn to a scale not smaller than 1/2" = 1'-0", and shall show clearly in both plan and elevation that all work can be installed without interference.

- D. Prior Installation. Any electrical work installed prior to approval of coordination drawings shall be at the Contractor's risk. Subsequent relocations required to avoid interferences shall be made without additional expense to the Owner. In case interference develops, the Engineer will decide which work shall be relocated, regardless of which was installed first.
- E. The existence of any wires, conduits, pipes, ducts or other service facilities is shown in a general way only. The Contractor is responsible for making the exact determination of the location and condition of these facilities.
- F. The Drawings indicate outlet and equipment locations, directions and locations of branch circuit wiring and homeruns. Verify all locations with actual field conditions.
- G. The horsepower of motors and apparatus wattages indicated on the plans and in the panel schedules are estimated requirements of equipment furnished under other Divisions of this contract and bid shall be based on these sizes. Overload elements, contactors, circuit breakers, fuses, conductors, etc., shall be furnished to suit actual equipment installed. Advise Engineer of any equipment changes affecting electrical circuits.
- H. The location of utilities indicated on the plans is taken from existing public records. The Contractor must determine the exact location and elevation of public utilities. The Contractor shall ascertain whether any additional facilities other than those shown on the Drawings may be present.
- I. The general directions and location of homeruns are indicated on Drawings and are to be extended to panels as though routes were completely shown. No homeruns or branch circuits are to be combined. Items which are installed other than as shown on Drawings and without receiving prior written approval will be ordered removed and installed as shown without additional cost to Owner.
- J. Owner shall not be responsible for any loss of unanticipated costs that may be suffered by the successful bidder as a result of such bidder's failure to fully inform himself in advance in regard to all conditions pertaining to the work and character of the work.
- K. Coordinate work with other crafts employed on the project. Should rearrangement or relocation of equipment be necessary, provide for approval the simplest layout possible for that particular portion of the work. Under no condition are beams, girders, footing or columns to be cut for electrical items unless so shown on Plans or written approval is obtained from the Architect or Engineer.
- L. Special attention shall be given for the following items and all conflicts shall be reported to the Engineer before installation for decision and correction:
  - 1. Door swings; switches shall be located on the "strike" side of the door.
  - 2. Location of radiators, grilles, pipes, ducts and other mechanical equipment so that all electrical outlets, lighting fixtures and other electrical outlets and equipment are clear from and in proper relation to these items.
  - 3. Location of cabinets and counters so that electrical outlets and equipment are clear from and in proper relation to these items.
  - 4. Within the limits indicated on the drawings, the maximum practicable space for operation, repair, removal and testing of equipment shall be provided.
  - 5. Contractor shall coordinate with HVAC installer (if separate from the Contractor) to wire the HVAC system when the installer is ready for power.
- M. Contractor shall consult the Architectural drawings for the exact height and/or location of all outlets, switches, lights, etc. specified herein or on the drawings.
- N. Outlet locations shown on the drawings are approximate. Contractor shall study the building drawings in relation to spaces and equipment surrounding each outlet so that the lighting fixtures are symmetri-

cally located according to ceiling tile and room layout. When necessary, with the Engineer's approval, outlet shall be relocated to avoid interference with structural features of the building.

- O. Call to the attention of the Architect any error, conflict or discrepancy in Plans and/or Specifications. Do not proceed with any questionable items of work until clarification of same has been made.
- P. Supplementary Details and Plans may be supplied as required and they will become a part of the Contract Documents. The Architect or Engineer reserves the right to make minor changes prior to installation of specific electrical systems in the location of the conduits, outlets, etc., from those shown on the plans without extra charge to the Owner.
- Q. Arrange work to reduce interruption of any existing service to minimum. When interruptions are unavoidable, consult Owner or Utility involved and agree in writing, with copy to the Architect, upon a mutually satisfactory time and duration.
- R. Mechanical (Division 23) / Electrical (Division 26) Coordination:

ITEM	FURNISH BY	INSTALL BY	POWER WIRING	CONTROL WIRING <sup>2</sup>
1. Division 23, Equipment Motors	DIV. 23	DIV. 23	DIV. 26	DIV. 23
2. Motor Control Centers	DIV. 26	DIV. 26	DIV. 26	DIV. 23
3. Motor Starters, Contactors and Overload Heaters	DIV. 23 <sup>1</sup>	DIV. 26	DIV. 26	DIV. 23
4. Fused & Unfused Disconnect Switches	DIV. 26	DIV. 26	DIV. 26	----
5. Manual Operation Switches, Multi-Speed Switches, Push-Button Stations and Pilot Lights	DIV. 26	DIV. 26	DIV. 26	DIV. 26
6. Control Relays & Transformers	DIV. 23	DIV. 23	DIV. 26	DIV. 23
7. Temperature Control Panels	DIV. 23	DIV. 23	DIV. 26	DIV. 23
8. Motorized and Solenoid Valves, Pneumatic/Electric and Electro-Pneumatic Switches	DIV. 23	DIV. 23	DIV. 26	DIV. 23
9. Duct Mounted Smoke Detectors	DIV. 26	DIV. 23	DIV. 26	DIV. 23
10. Fire/Smoke and Smoke dampers	DIV. 23	DIV. 23	DIV. 26	DIV. 23

- 1. Except where such devices are located in a motor control center.
- 2. Division 26 responsible for power requirements for control transformers, coordinate with Division 23 contractor.

1.06 Substitution Requests

- A. Substitution of Equipment. (Prior To Bid).
  - 1. Bids shall be based only upon the materials, construction and equipment specifically identified in the bidding documents, except as hereinafter provided.
  - 2. If Contractors wish to use items of equipment other than those named in their base bid, Contractor shall apply in writing to the Engineer for approval of substitution at least 10 days prior to opening of bids, submitting with his request for approval complete descriptive and technical data on the items he proposes to furnish.
  - 3. Equipment and materials proposed for substitution shall be similar in design and equal in quality and function to those specified.

4. Submittal shall be in triplicate with identification of the item to be substituted and clearly marked with all pertinent data depicting proper characteristics of proposed item.
5. Contractor's description of his proposed substitution shall specifically note all differences between the item specified and the proposed substitution.
6. If the Engineer approves any proposed substitution, such approval will be set forth in an Addendum or in writing to the person submitting equipment for approval.
7. Where a substitution alters the design or space requirements indicated, Contractor shall include all items of cost for the revised design and construction including cost of all allied trades.
8. Unless requests for changes in base bid specifications are received and approved prior to the opening of bids, as defined above, the successful Contractor will be held to furnish specified items under his base bid. After Contract is awarded, changes in specifications will be made only as defined under Substitution of Equipment. (After bid).

B. Substitution of Equipment or Materials. (After Bid).

1. After execution of the Contract, substitution of equipment or makes other than those specifically named in the Contract Documents will be approved by the Engineer for the following reasons only:
2. That the equipment proposed for substitution is equal to and/or superior to equipment named, in construction, efficiency and utility, and further that the equipment named in the specifications cannot be delivered to the job in time to complete the work in proper sequence to work of other Contractors, due to conditions beyond the control of the Contractor.
3. To receive consideration, requests for substitutions must be accompanied by documentary proof of equality or difference in price and delivery, if any, in the form of certified quotations from suppliers of both specified and proposed equipment.
4. In case of a difference in price, the Owner shall receive all benefit of the difference in cost involved in any substitution and the Contract altered by Change Order to credit Owner with any savings so obtained.

1.07 Submittals: Shop Drawings And Material Lists

- A. In addition to the requirements of General Conditions of Division 01, submit manufacturers data and Shop Drawings and Material Lists as required by individual sections of Division 26 (and otherwise associated Divisions).
- B. Before commencing work and within 30 days after award of contract, furnish six (6) copies of complete Shop Drawings and Material Lists to the Architect or Engineer.
- C. Include only information on exact equipment installed; not complete "line" of manufacturer. Where sheets show proposed equipment as well as other equipment, identify proposed equipment with black arrow, underlining or circling. Contractor is not to use red. Diagrams for systems to be complete Drawings for specific system installed. "Typical" line diagrams not acceptable unless properly marked to indicate exact system for this project.
- D. Single Submission. Data and shop drawings shall be supported and included in a single submission. Multiple submissions are not acceptable except where prior approval has been obtained from the Engineer. In such cases, a list of data to be submitted later shall be included with the first submission.
- E. Shop Drawings. Shop drawings shall include complete construction details, dimensions, material descriptions, diagrams or pictures showing physical characteristics, performance and test data, description of operation, installation methods, wiring diagrams and any other data or information necessary for a complete evaluation. (Note: do not re-draw the contract drawings. The drawings to be submitted under this subsection are all the supplemental drawings and manufacturers' specification drawings which are not included in the contract drawings.) Shop drawings are in addition and supplemental to the contract drawings.
- F. Identification. In addition to the requirements of Special Provisions, submittals shall be identified by the name of the system and applicable specification paragraph number.



- G. Delivery Prior to Approval. No item of material or equipment shall be delivered to the site or installed, until approved. After the proposed materials have been approved, no substitution will be permitted except where approved by the Engineer.
- H. Compliance. Should the Contractor fail to comply with the requirements of these provisions, the Engineer reserves the right to select any or all items of materials and systems. Selection shall be final and binding upon the Contractor. Materials so selected or approved shall be used in the work at no additional cost to the Owner.
- I. Departures. If departures from the contract drawings are deemed necessary by the Contractor, details of such departures, including changes in related portions of the project and the reasons therefore, shall be submitted with the drawings. Where such departures require raceways or equipment to be supported otherwise than as shown, the details submitted shall include loadings and type and kind of frames, brackets, stanchions, or other supports necessary. Approved departures shall be made at no additional cost to the Owner.
- J. Electrical Diagrams. A complete electrical connection diagram for each item of equipment furnished under Division 26, which has electrically controlled components having more than one automatic or manual control device, shall be submitted for approval. Wiring diagrams shall identify each component, and one diagram shall show all interconnected or interlocked components. It is understood that the contract electrical drawings do not have to be submitted or copied for inclusion in this submittal.
- K. Contractor agrees that submittals processed by the Engineer are not change orders; that the purpose of submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.
- L. Late submittals will not be considered an excuse for time extension for the project.
- M. Data not in conformity with these requirements will be returned for resubmittal.
- N. Organization:
  1. Assemble Shop Drawings and submittal data in hard cover loose-leaf ring binder. Provide cover with permanently attached typewritten or printed label with name of project, job number and heading reading "ELECTRICAL SUBMITTAL DATA".
  2. Organize data in each set in basic categories listed in index for Division 26 (and otherwise associated Divisions). Provide submittal data with typewritten index having same sequence, numbering and wording as index for Division 26 (and otherwise associated Divisions). In addition, provide divider sheets between each section with identifying tabs having same designations as index. Organize material in each section in same order and identify with same number and wording as paragraphs of specification section.
  3. Submit neat, clean copies of data, 8-1/2 inch by 11-inch size. Accordion fold required drawings to 8-1/2 inch by 11-inch size and include in submittal binder.

1.08 Electrical Equipment Operation and Maintenance Manuals

- A. In addition to the requirements of the General Conditions of Division 01, submit manuals as required by individual Sections of Division 26 (and otherwise associated Divisions).
- B. Provide all electrical equipment and control information. The purpose of this manual is to provide one comprehensive document that illustrates and describes all the electrical equipment and instrumentation installed in the plant.
- C. For final acceptance of Division 26 work, provide to the Architect or Engineer six (6) copies of complete electrical operating and maintenance manuals for servicing of all equipment installed.
- D. Information included must be exact equipment installed, not complete "line" of manufacturer. Where sheets show equipment installed as well as other equipment, identify installed equipment with black arrow, underlining or circling. Contractor is not to use red. Diagrams for each system to be complete

Drawings for specific system installed. "Typical" line diagrams not acceptable unless properly marked to indicate exact system for this project.

- E. Information shall include all revisions noted in shop drawings. Copies of stamped drawings are not acceptable.
- F. Provide General Contractor's name, contact person, telephone/fax numbers, include similar information for the sub-contractors.
- G. Include all electrical devices provided under all Divisions. Coordinate with other Division Contractors. The Contractor shall coordinate with the Division 17 contractor and the Software Integrator to include pertinent documentation from their responsibilities in this submittal.
- H. Manuals and documentation shall include calibration curves of every sensing device and a programming documentation sheet for every programmable device. The programming documentation sheet shall show the final operational value of every programmable parameter of every device. The purpose of this sheet is to provide maintenance personnel with a convenient source of information for programming the parameters of a replacement device should the old device fail.
- I. Organization:
  - 1. Assemble Shop Drawings and submittal data in hard cover loose-leaf ring binder. Contractor shall insert printed spine and cover title sheets to match font style and size of the rest of the plant O&M manual set. Coordinate with the General Contractor.
  - 2. Organize data in each set in basic categories listed in index for Division 26. Provide submittal data with typewritten index having same sequence, numbering and wording as index for Division 26. In addition, provide divider sheets between each section with identifying tabs having same designations as index. Organize material in each section in same order and identify with same number and wording as paragraphs of specification section.
  - 3. Submit neat, clean copies of data, 8-1/2 inch by 11-inch size. Accordion fold required drawings to 8-1/2 inch by 11-inch size and include in submittal binder.

#### 1.09 Project Record Drawings

- A. Maintain at the site one complete set of full-sized original prints for recording installed conditions (As-Built). Keep record Drawings clean, undamaged and up to date as work progresses. Accurately indicate electrical work as actually installed with indications of all deviations, additions and omissions in red ink. Locate all buried exterior raceways or cables by actual dimensions from walls, center-lines or fixed points of reference.
- B. The purpose of these Record drawings is to provide the Engineer with an easy to read, complete record of the installation so that at the end of the project the Engineer can revise the original contract drawings to represent the actual installation. Color-coded and highlighted notes shall be used if these would make the Record Drawings easier to read.
- C. At the completion of the work, Contractor shall furnish the Engineer this original set of marked-up drawings. Final payment to the Contractor will not be authorized until these drawings have been submitted to and accepted by the Engineer.

#### 1.10 Certificates

- A. For final acceptance of Division 26 work (and that of otherwise associated Divisions), provide certificate of approval from the applicable regulatory and permitting agencies certifying that the electrical work has been inspected and that the work conforms with the minimum requirements of the State Electrical Codes.

#### 1.11 Warranty

- A. See Division 01.

### PART 2 - PRODUCTS

#### 2.01 Materials

- A. Unless otherwise specified, all material to be new of recent manufacture, carrying full factory warranty, UL approved or approved by local inspection authority.
- B. All like materials shall be by the same manufacturer throughout the project.
- C. All material shall be new and bear manufacturer's name, model number, electrical characteristics and other identification and shall be the standard product of manufacturer regularly engaged in production of similar material.
- D. Access Panels:
  - 1. Provide access panels of adequate size for equipment requiring service and installed above plaster or gypsum board ceilings, behind walls or in furring.
  - 2. Furnish complete with correct frame for type of building construction involved. Size, number and location of access panels is not necessarily shown on Drawings.
  - 3. Use no panel smaller than 12 inches by 12 inches for simple manual access, nor smaller than 16 inches by 20 inches where personal must pass through.
  - 4. Access panels shall maintain ceiling fire rating.
  - 5. Acceptable Manufacturers: Milcor A, K, L, or M panels or equivalent Bilco or Potter - Roemer as required by construction.

### PART 3 - EXECUTION

#### 3.01 Excavation/Trenching

- A. Provide trenching, backfilling, compaction, repaving or other site restoration as required by the work done in this Division.
- B. Determine location of all existing underground gas, water, sewer, telephone and electric lines. Locate accurately on ground surface and for depth of same before excavation. Uncover by hand digging. Contractor shall be responsible for any damage or interruptions to these utilities, caused by himself, and other costs incurred by these interruptions.
- C. Do not undermine footings or bearing walls.
- D. Use power-digging equipment only in direction away from existing facilities.
- E. Exercise standard safety precautions in excavation near power cables by using insulated handles, rubber gloves and footwear, etc.
- F. Do not place backfill until installation to be covered has been tested, inspected and approved.
- G. Minimum conduit burial depth shall be 24 inches, unless otherwise noted.
- H. Install a detectable six inch wide yellow vinyl tape with letter "Caution: Buried Electrical Line Below" 18 inches above all buried services conduit and wire not under structures.
- I. Backfill:
  - 1. Backfill material for all trenches under paved areas shall be coarse sand or crushed rock, installed in layers not to exceed six inches and compacted to 95% of maximum density at optimum moisture content to preclude subsequent settlement.
  - 2. The top 18 inches of trenches in landscaped or grassed areas shall be backfilled with native soil and tamped.
- J. Conduits piercing a building waterproof membrane shall be provided with flanges, using two neoprene washers, one washer on each side of membrane, between each flange and membrane.
- K. All underground conduits which enter the building penetrating poured-in-place slabs:
  - 1. Shall be sloped to drain away from the building and shall be water sealed to prevent moisture from passing through the conduit into the building. All joints to be threaded and taped or glued to prevent entry of water into the conduits.

2. Shall be poured-in-place, or provide with watertight conduit sleeves and rubber seals, Link-seal system by Thunderline Corporation or equivalent.
3. Shall be rigid galvanized steel a minimum of 12-inches under the slab and 6-inches above the slab.

### 3.02 Cutting

- A. Perform or arrange and pay for required cutting of concrete, masonry, wood, structural framing, etc.
- B. Cutting or channeling of underpinning or structural members is not permitted without prior permission of the Engineer.
- C. No weakening of structural parts is permitted and the Contractor will correct any work impaired.

### 3.03 Patching

- A. Where trenching is done through existing paving, walks, curbs, etc., the Contractor is responsible to patch and repair these structures to original condition.
- B. Patch all openings in and through concrete and masonry with dry pack.
- C. In new work, patch and refinish all finished surfaces damaged by this contractor to match adjacent surface.
- D. Where new electrical work is installed in the existing building, patch and refinish surfaces damaged to match existing. Refinishing to be as directed by the Architect or Engineer.

### 3.04 Framing And Blocking

- A. Structural framing will be done by the Contractor.
- B. Blocking required for sole use of electrical work such as fastening and support of outlet boxes, fixtures, panels, conduit, etc., will be by the Electrical Contractor.

### 3.05 Housekeeping Pads

- A. Provide concrete housekeeping pad under Motor Control Centers, transformers, pumps, or any floor mounted switchboard.

### 3.06 Protection

- A. Cap or plug all raceway openings during construction.
- B. Protect all completed work against dirt, water or chemical damage, mechanical accident or injury.
- C. Equipment found damaged or in other than new condition will be rejected as defective.

### 3.07 Sleeves

- A. Where conduit passes through masonry or concrete, install sleeves during construction of same.
- B. Where conduit must by necessity pass through beams or columns, install sleeves located as directed by Engineer.

### 3.08 Identification

- A. Label complete electrical system to indicated use of each item of equipment or load served.
- B. Identification of Disconnecting Means: Provide identification of disconnects in accordance with Section 110-22 and Section 240-83 of the National Electrical Code.
- C. Identification of Conductors and Components for Distribution Systems Operating at Two or More Different Voltages: Identify components in accordance with Section 210-4(d) of the National Electrical Code. Required labeling shall be by Micarta plate.
- D. Provide black laminated white core engraved nameplates with lettering not less than 3/16 inch high attached to the outside of junction boxes larger than 4-11/16 inch; surface mounted cabinets, panelboards, time switches; disconnect switches, starters, contactor, relays; subdistribution and branch circuit panelboards, dry transformers and other items indicating equipment or load served. At flush

mounted cabinets, panelboards, time switches and similar items mount nameplate on inside of door at finished areas and on outside of door at mechanical, storage rooms and other non-public spaces. Attach nameplates with epoxy glue.

- E. Flush mounted devices with stainless steel or plastic finish plates requiring identification to be engraved with lettering not less than 1/8 inch high with black color filling.
- F. Provide typewritten circuit schedules for panelboards, cross-connect panels and terminal cabinets. Schedules shall be covered with minimum of 0.018 inch thick clear rigid plastic installed in permanently attached metal frame holder located on inside face of door. Schedules to use final assigned room names/numbers, loads not plan designations.
- G. When making modifications to existing equipment or panelboards, provide labels as indicated in this section. Provide new typewritten circuit schedules for all modified panelboards.
- H. At Main Distribution Panels provide black laminated white core engrave nameplates attached to panel exterior with epoxy glue. Size of nameplate and lettering as directed. Label distribution breakers, main breakers, sub-breakers and panel sections to identify all components and voltage and phase of system. In addition, provide master nameplate indicating project name, date, Architect (when applicable), Electrical Engineer, and Electrical Contractor. Lettering minimum of 1/4 inch high. Provide half-sized electrical one-line diagram (s) framed and mounted on wall near main distribution panel (s).

### 3.09 Installation

- A. Wiring Requirements: Install wiring complete to every outlet with all devices shown and/or required. All wiring to be in raceways and concealed throughout finished areas unless specifically noted otherwise. For the purpose of electrical specifications, all areas, with the exception of boiler rooms, mechanical rooms and mechanical spaces, are to be considered as finished areas.
- B. Provide raceway connections between outlets, outlets and panels and equipment and panels as shown on Drawings. Size raceways according to governing codes unless otherwise noted.
- C. Locations:
  - 1. Verify all locations with actual field conditions, and plans to avert possible installation conflicts.
  - 2. Coordinate work with that of other trades to assure symmetrical placing of fixtures in respect to ceiling tile, grilles, etc.
  - 3. Cabinets: Where electrical outlets occur in face, decks or base of cabinets or in walls above counters, carefully coordinate with details and arrangements of same.
  - 4. Any work, which is incorrectly installed without prior verification with General Contractor, Architect, Engineer and Drawings, will be ordered removed and relocated and any damage to other work shall be repaired at no cost to the Owner.
  - 5. In general, locate outlets as indicated in symbol schedule on Drawings.
- D. All mounting heights shown on drawings are from finish floor to centerline unless otherwise shown. Mounting heights at non-typical locations shown with (+) sign and height required noted adjacent to outlet. Outlets located in concrete block, brick or tile walls are to be adjusted in height to coordinate with modular joints of the materials.

### 3.10 Painting

- A. Painting in general will be covered under another Division of this specification, except items furnished under this Division that are scratched or marred in shipment or installation and/or require custom painting.
- B. Install equipment with manufacturer's standard finish and color unless otherwise specified. Refinish any marred or oxidized items restored to manufacturer's factory finish.
- C. Required surfaces or equipment with no standard finish; clean off grease and scale. Restore to smooth finish. Give one coat of primer, two coats finish.
- D. Paint and color as selected by Architect or Engineer.

- E. All exposed conduits on painted walls shall be painted to match wall and trim colors. Conduit labels shall be neatly affixed and shall not be painted over.
- F. All electrical equipment and conduit exposed in finished areas and on exterior walls shall be painted to match surrounding surfaces.
- G. Contractor shall coordinate the timing of painting requirements.
- H. Refer to architectural specifications for methods and materials.

### 3.11 Future Provisions

- A. Provide pull line in each empty conduit provided for future installation of wiring.
- B. At all systems such as fire alarm, etc., where future stations are to be fed from adjacent outlets or terminal cabinets, all conductors required for complete installation of additional units are to be provided to nearest outlet or terminal cabinet as required. In general, all wiring installed so it will not be necessary to remove existing conductors and repull additional wiring to install additional units. All spare conductors properly labeled and terminated in outlet boxes or at terminals in terminal cabinets.

### 3.12 Noise Control

- A. To minimize noise transmission between occupied spaces, outlet boxes at opposite sides of partitions are not to be placed back to back and installation of straight-through boxes is not permitted.
- B. Contactors, transformers, starters and similar noise producing devices shall not be placed on walls, which are common to occupied spaces unless specifically called for on Plans. Where equipment is mounted on wall common to occupied spaces, provide shock mounting or noise isolators to effectively prevent transmission to occupied spaces.
- C. Ballasts, contactors, starters and like equipment found noticeably noisier than similar equipment of same type are to be removed and replaced as directed by Engineer at no cost to Owner.

### 3.13 Fire-Stopping

- A. Where raceways penetrate floors, ceilings, ducts, chases and fire walls, provide fire stopping to maintain integrity of the fire assembly. The code authority having jurisdiction shall approve fire-stopping method.
- B. Where electrical boxes exceeding 16 square inches are located in fire resistive walls, fire stopping shall be provided to maintain integrity of the fire assembly.

### 3.14 Continuity Of Service

- A. Keep outages to occupied areas to a minimum and prearrange all outages with Owner, Engineer and utilities involved. Requests for outages shall state the specific dates and hours and the maximum durations, with the outages kept to these specified times. When power interruptions will last longer than 5 minutes and cover more than 10% of the building, or affect public areas, they shall be performed on the weekend between 1 and 5 AM.
- B. Contractor shall coordinate with Owner or Engineer so that work can be scheduled not to interrupt operations, normal activities, building access, etc. Coordinate work with other crafts for proper scheduling.
- C. No circuits shall be turned off without prior approval from Owner or Engineer. Coordinate with the operations, normal activities, building access, etc. Coordinate work with other crafts for proper scheduling.
- D. This contractor shall be liable for any damages resulting from unscheduled outages or for those not confined to the preapproved times. Include all costs for overtime labor as necessary to maintain electrical services in the initial bid proposal. Temporary wiring and facilities, if used, shall be removed and the site left clean before final acceptance. Requests for outages must be submitted at least (5) days prior to intended shutdown time.

- E. When applicable, include in bid cost of minimum temporary power to Fire Alarm System, Security, Telephone/Data equipment and any other equipment designated by Owner, during time when primary building power has been interrupted.

### 3.15 Demolition And Salvage At Existing Structures

- A. Contractor shall make all necessary adjustments to the electrical system required to meet code, accommodate installation of the new work, and for demolition and removal at existing structures.
- B. Remove all existing fixtures, controls, clocks, switches, receptacles, and other electrical equipment and devices and associated wiring from walls, ceilings, floors, and other surfaces scheduled for remodeling, relocation, or demolition unless specifically shown as retained or relocated on the drawings. If existing walls, ceiling, floors, etc. are moved, extend existing devices, fixtures, and circuiting to the new location.
- C. Disconnect all existing mechanical equipment scheduled for removal or relocation as described in specifications and shown on the Plans. Remove abandoned raceways and cables. Re-label panels and motor controls centers to reflect changes.
- D. If existing junction boxes will be made inaccessible, or if abandoned outlets serve as feed through boxes for other existing electrical equipment that is being retained, new conduit and wire shall be provided to bypass the abandoned outlets. If existing conduits pass through partitions or ceilings which are being removed or remodeled, new conduit and wire shall be provided to route around the ceiling or wall and maintain service to the existing load.
- E. Extend circuiting and devices in all existing walls to be furred out.
- F. Locations of items shown on the drawings as existing are partially based on as-built and other drawings which may contain errors. The Contractor shall verify the correctness of the information shown prior to bidding and provide such labor and material as is necessary to accomplish the intent of the contract documents. The plans may show some demolition conditions, but are not intended to show all of them.
- G. All materials accumulated during the demolition process are the Owners property and shall be removed from the job site as directed by the Owner.

### 3.16 Work At Existing Structure

- A. Connect to and extend all existing electrical systems as required. Verify location of existing raceways stubbed out. If raceways indicated are not of proper size or in proper location, provide new as required for completion of project.
- B. At areas where new ceilings are being installed, remove existing light fixtures and provide box extensions and reinstall existing fixtures. See Architectural Drawings for areas involved.

### 3.17 Safety

- A. The Drawings and the specifications do not include design or construction details or instructions relating to the Contractor's safety precautions or to means, methods, techniques, sequences or procedures required for the Contractor to perform his work.
- B. The Contractor shall provide necessary shoring, railing, barricades, protective devices, safety instructions and procedures to perform the work safely and to comply with State Safety Requirements and OSHA requirements.

### 3.18 Cleanup

- A. Contractor shall continually remove debris, cuttings, crates, cartons, etc., created by his work. Such clean up shall be done at sufficient frequency to eliminate hazard to the public, other workmen, the building or the Owner's employees. Before acceptance of the installation, Contractor shall carefully clean cabinets, panels, wiring devices, cover plates, light fixtures, etc., to remove dirt, cuttings, paint, plaster, mortar, concrete, etc. Blemishes to finished surfaces of apparatus shall be removed and new finish equal to the original applied.

### 3.19 Asbestos Bearing Materials

- A. If during the course of his work, the Contractor observes the existence of asbestos or asbestos bearing materials, the Contractor shall immediately terminate further work on the project and notify the Owner of the condition. The Owner will, after consultation with the Architect, determine a further course of action.

### 3.20 Polychlorinated Biphenyls (PCB's)

- A. If during the course of his work, the Contractor observes the existence of polychlorinated biphenyls (PCB's), the Contractor shall immediately terminate further work on the project and notify the Owner of the condition. The Owner will, after consultation with the Architect, determine a further course of action.

### 3.21 Testing.

- A. Test the entire electrical installation to assure compliance with code and proper system operation.
  - 1. Circuit Tests. The Contractor shall test all wiring and connections for continuity and ground before any fixtures or other loads are connected. Tests shall be made with a 500 volt DC "Megger" type tester. If tests indicate faulty insulation (less than 2 megohms) such defects shall be corrected and tested again. Contractor shall provide all apparatus and material required to make tests and shall bear all expense of required testing.
  - 2. Load Balancing. Checks shall be made for proper load balance between phase conductors and make adjustments as necessary to bring unbalanced phases to within 15% of average load.
  - 3. Ground Testing. Measure the OHMIC value of the Electric Service Entrance metallic "System Ground" with references to "Earth Ground" using the "Multiple Ground Rod" method and suitable instruments. Maximum resistance to ground shall be less than 10 ohms. If this resistance cannot be obtained with the ground system shown, notify the Engineer immediately for further instruction. Certify in writing to the Engineer that the grounding test has been made and that the requirements of this portion have been met for the "System Ground".
  - 4. Motor Tests. Check all motors for proper rotation and for actual load current. Submit tabulation of motor circuits.
- B. Materials and instrumentation shall be provided by the Contractor.
- C. The Contractor shall notify the Engineer ten (10) working days prior to performance of any test.
- D. The Contractor shall certify in writing that the above tests have been completed and shall provide documentation of test data.

### 3.22 Instruction Of Owner Employees

- A. Instruct operation and maintenance personnel selected by Owner's representative at a single designated time in operation and maintenance of the entire electrical system and its components.
- B. Electrical Contractor shall provide one 8-hour working day of instruction to Owner designated personnel. Software Integrator shall provide one 8-hour working day of instruction to Owner designated personnel after all equipment is fully operational and functional. The time for this instruction shall be scheduled shortly after start-up and at mutually agreed times. Contact Engineer for coordination.
- C. Specific sections elsewhere in this Division may require additional training.
- D. On completion of instructions, obtain from Owner certification in writing that demonstration had been given and instructions had been understood.

### 3.23 Demonstration Of Completed Electrical System And Controls

- A. At the point of substantial completion of the project, the Electrical Contractor shall provide necessary personnel to demonstrate the essential features of the following electrical systems:
  - 1. Service entrance equipment.
  - 2. Motor Control Center and all related items such as controls, alarms, and PC equipment, etc.



3. Lighting system.
  4. Heating system.
  5. Ventilation.
  6. Pumps, pump station, blowers, mixers, and related controls and alarm.
  7. Instrumentation
- B. Demonstrate each system once after all malfunctions have been corrected.
- C. Time. Demonstration shall be held upon completion of all systems at a date agreed upon in writing by the Owner or his representative. This time shall be in addition to the instruction allowances provided.
- D. Attending Parties. The demonstration shall be held by the Contractor and Electrical Subcontractor in the presence of the Owner or his designated representative, Electrical Engineer, Project Engineer, and the Equipment Manufacturer's representative.
- E. Demonstration.
1. Demonstrate the functions and locations of each system, and indicate its relationship to the Riser Diagram in the Drawings.
  2. Demonstrate by "start-stop operation" and "automatic operation", how to work the controls, how to reset protective devices or replace fuses, and what to do in case of emergency.
  3. All systems shall be exercised through operational tests in order to demonstrate achievement of the specified performance. Operational tests depend upon completion of work specified elsewhere in these Contract Documents. The scheduling of tests shall be coordinated by the Contractor among all parties involved so that the tests may proceed without delays or disruption by uncompleted work.
- F. Certificate of Complete Demonstration. Submit a Job Completion Form found at the end of this Section. Provide documentation of all test data.
- 3.24 Payment for Work.
- A. Payment for work under this Division shall be covered and included as part of the Basic Bid on the project, or as outlined under any schedules.

END OF SECTION

BLANK PAGE

**SECTION 26 0510  
RACEWAYS, BOXES & CONDUCTORS**

**PART 1 - GENERAL**

1.01 Description

- A. Provide conductors, cables, connectors, lugs, cable ties and terminations for all systems.
- B. Provide all raceways, fittings, outlet boxes, junction boxes, pull boxes and special boxes required for complete project. Install all systems in raceways unless specifically noted otherwise.
- C. Not all conduits are shown. Where not specifically indicated, Contractor shall be responsible for sizing conduit per applicable codes for number of conductors.
- D. Provide all seismic bracing (as required for the applicable seismic zone as determined by the Geotechnical Engineer or Architect) of equipment, feeders and other electrical items in accordance with prevailing codes. Produce and submit the required designs, calculations, certifications and stamped drawings to the authority having jurisdiction and obtain their approval prior to installation or fabrication. Comply with latest edition of the SMACNA Seismic Restraint Manual.
- E. Related work in other sections includes.
  - 1. Providing conductors, Section 26 0519, Conductors and Cables.
  - 2. Providing boxes, Section 26 2726, Wiring Devices and Floor Boxes.
  - 3. Providing supporting devices, Section 26 0529, Hangers and Supports.

1.02 Quality Assurance

- A. UL listed.

1.03 Product Delivery, Storage And Handling

- A. Deliver raceways with UL label and bearing manufacturer's name on each length.
- B. Store and handle raceways and boxes so as not to subject them to corrosion or mechanical damage and in a manner to prevent damage from environment and construction operation.
- C. Cap raceway ends until used.
- D. Deliver fittings in manufacturer's original unopened and undamaged packages with labels legible and intact.

**PART 2 - PRODUCTS**

2.01 Conductors

- A. Secondary service entrance conductors: Copper 600 volt type "THW", "THHN", or "XHHN" stranded, unless otherwise noted. Sizes as shown on Drawings.
- B. Feeder conductors:
  - 1. Copper, 600 volt, type "THW", "THHN" or "XHHW" unless otherwise noted, sizes as shown on drawings.
  - 2. Aluminum conductors are acceptable as panelboard feeders as shown on drawings for copper sizes #2/0 AWG and above only.
  - 3. Drawings are based on copper conductors, contractor to provide a list of conductor and conduit sizes to the Engineer for review for all aluminum conductors to be used. List to be provided prior to ordering material.
- C. Branch circuit conductors:

1. Copper, minimum size No. 12 AWG. Conductors No. 12 and No. 10 AWG shall be soft drawn, solid copper. Conductors larger than No. 10 AWG to be stranded, soft-drawn copper. Use type "THW", "THWN", or "THHN". Special conductor types where noted or required by code.
- D. Low-Voltage: Provide low-voltage conductors as per individual manufacturer's recommendations.
- 2.02 Metal Clad Cable:
- A. Cable shall be steel or aluminum jacketed interlocking armor with internal fully insulated green grounding conductor. Cable shall contain multi-conductor thermoplastic insulated type THHN color-coded solid or stranded copper conductors and shall be UL approved for the intended application.
  - B. Connections, terminations and fasteners shall be UL approved for the application, and designed specifically for use with the cable used, and shall have insulated throats to protect the wire.
  - C. Approved Manufacturers: MC Cable: AFC/A Nortek Company, Type Mc-Lite, HC-90; Alflex, Armolite.
  - D. Tools: Use only tools approved by cable manufacturer. Cutting tool should be controlled depth rotary cutter.
  - E. See Installation for specific restrictions on use of MC Cable.
- 2.03 Rigid galvanized steel and IMC conduit:
- A. Rigid galvanized conduit: Rigid steel zinc coated, manufactured in accordance with UL-6, ANSI, and Federal Specifications WW-C-540 standards.
  - B. Intermediate Metal Conduit (IMC): Zinc coated galvanized steel to comply with UL-1242, Type J and ANSI Standards.
  - C. Application:
    1. Employed for runs embedded in concrete, concrete block, underground, wet or damp locations, where subject to mechanical injury, and where exposed within eight feet of floor.
    2. Make threads watertight with bituminous sealer (solvent type cut back) before assembly where installed underground, in moist locations or where exposed to weather.
  - D. Fittings: Threaded iron or steel only, Thomas & Betts or O-Z/Gedney in sizes up to 1-1/2 inch plastic insulating type O-Z/Gedney type "A", or "T&B" 220 Series; sizes above 1-1/2 inch insulated metallic bussings O-Z/Gedney type "B" and "T&B" 1220 Series.
- 2.04 Rigid Stainless Steel conduit: Solid stainless steel.
- A. Application: Required in most outdoor marine or corrosive environments or as specified.
  - B. Fittings: Threaded stainless steel. Erickson couplings, watertight split couplings (OZ or equivalent) permitted so long as all components are of the same stainless steel alloy and are waterproof.
- 2.05 Electrical metallic tubing (EMT): Steel zinc coated, to comply with ULI-797 and ANSI Standards.
- A. Application:
    1. Dry locations only. May be used in framed construction, furred ceilings and above suspended ceilings.
    2. May be exposed in unfinished areas where not subject to damage.
  - B. Fittings: Connectors and couplings to be case steel. Preinsulated connectors and couplings up to one (1) inch trade size may be compression, indenter or setscrew type. Fittings above one (1) inch trade size shall be compression type. All connectors shall have insulated throats. Thomas & Betts, Steel City or approved.
- 2.06 Liquidtight flexible metal conduit: Zinc steel core with smooth gray abrasion resistant, liquidtight, polyvinyl chloride cover (with integral ground wire wound in steel core), to comply with UL 360 and ANSI Standards. Anaconda Sealtite type U.A. Electro Flex L4, Alflex Ultratite UL or EF or approved.

- A. Application: For connection to equipment. Minimum size 3/4-inch for motor connections. Use 3/8-inch only for fixture and control wiring. Provide sufficient length of flexible conduit to avoid transmission of vibration.
  - B. Fittings: "Thomas & Betts" Supertite or approved.
- 2.07 Flexible metal conduit, to comply with UL360, ANSI Standards, and Federal Specification WW-6-566.
- A. Application:
    - 1. Permitted only in dry locations where flexibility is required in length not over 18 inches.
    - 2. Minimum size required 1/2 inch, unless noted otherwise.
    - 3. Where flexibility is not required, flexible metal conduit is not to be used without written permission of the Architect or Engineer.
  - B. Fittings: Screw-in-type factory preinsulated "Thomas & Betts".
- 2.08 Non-metallic conduit: Polyvinyl chloride schedule 40 heavy wall UL listed for underground and exposed applications in accordance with National Electrical Code to comply with NEMA TC2. Carlon Electrical Products, PWC or approved.
- A. Application:
    - 1. Permitted for runs embedded in concrete or underground in wet or damp locations.
    - 2. All conduit offsets and bends made with factory fittings.
    - 3. All 90 degree ells and conduit entrances into buildings to be with rigid galvanized or fiberglass conduit.
    - 4. PVC conduit installed under roadways or areas subject to heavy traffic shall be provided with a minimum of 36" cover.
    - 5. Fiberglass or galvanized rigid elbows shall be used for angles larger than 30 degrees where the conduit size is greater than one inch.
    - 6. Provide a ground wire sized per code in all PVC conduits. Conductor quantities indicated in conduits do not include ground wires unless otherwise noted.
- 2.09 Wireways: All steel with screw covers. Parts coated with rust inhibitor and finished in color to match adjacent distribution equipment. Where located separate from distribution and control equipment, finish standard industrial gray enamel.
- 2.10 Surface raceways:
- A. Allowed only upon prior approval by Architect or Engineer.
  - B. Surface mounted "Raceway" type, size and with number, spacing and type of outlets shown on Drawings. Provide raceways with all connectors, end fittings and miscellaneous items required for complete installation. Finish standard gray or beige as selected. Wiremold Co., Mono System or approved.
  - C. Install parallel to building surfaces.
- 2.11 Seals and Fittings:
- A. Conduit plugs: Ideal "Conduloc" sizes 1/2 inch through one inch and T&B, Push Penny Plugs Series 1470 for 1-1/4 inch and larger, or approved for sealing conduits during construction. Steel City PL-200 series screwdriver slot threaded meter plugs or Killark Cat. No. CUP-O through CUP-9 for permanent plugs.
  - B. Floor and wall entrance fittings: O-Z/Gedney Electrical Mfg. Co. Type "FSK" entrance seal.

- C. Expansion fittings: O-Z/Gedney Electrical Mfg. Co. Type 'E' expansion coupling with bonding jumper for up to four inch of movement.
  - D. Conduit seals: Vertical or horizontal type Crouse Hinds type "EYS" or approved.
  - E. Lead Roof Flashing Assembly: Open top caulk, six inch diameter skirt, Stoneman Engineering & Manufacturing Company No. S1000-4 for 1/2 inch diameter through eight inch diameter. Caulking compound G.E. Silicon Construction Sealant SCS-1200 or Dow Corning 781. Refer to Architectural.
  - F. Wall and floor fire and smoke barriers: Concrete floor type O-Z/Gedney Gedney Co. "Fire Seals" or approved. UL labeled fire barrier material installed in accordance with manufacturer's recommendations. 3M Branch Fire Barrier System; Chase Technology Corp. No. CTC PR-855; Fire Stopping Products SpecSeal, Putty, Sealant, Collars, and Mortar; or approved.
- 2.12 Pull lines: Polyline as manufactured by "Greenlee" or approved.
- 2.13 Underground Marking Tape:
- A. Power: 6" wide, yellow, low density polyethylene, 4-mil thickness. Imprinted with "CAUTION – STOP DIGGING – BURIED ELECTRIC LINE BELOW" and current date. Somerset "Protect-A-Line" or approved.
  - B. Telephone/Data: Similar to Power tape except green.
- 2.14 Boxes
- A. Outlet boxes: Steel City, National, or approved, steel boxes as best suited for purpose intended and as follows:
    1. Lighting outlets: Four-inch octagon with 3/8-inch fixture studs.
    2. Switch and receptacle outlets: Four inch square with proper device cover.
    3. Telephone/Data: Four inch square by minimum 2-1/8 inch deep. See Telephone/Data specification for additional requirements.
    4. Gang boxes: One piece pressed steel minimum 1-1/2 inch deep by four inches high by length required with proper device covers.
    5. Masonry outlets: Standard boxes as specified above with square cornered tile wall covers with raise of depth required for specific conditions encountered. Steel City 52-C-49 and 72-C-49 series or approved.
    6. Utility boxes: Allowed only with special permission of Engineer.
    7. Special outlet boxes: See other section of specification for special outlet boxes.
  - B. Device covers for outlet boxes: Raised pattern, 3/4 inch minimum raise at plaster work, all other covers with raise equal to total wall material thickness. Surface boxes with 1/2 inch raise and rounded edges. Steel City, Raco or approved.
  - C. Extension rings: 1-1/2 deep. Steel City, Raco or approved.
  - D. Pullboxes
    1. Pullboxes: Galvanized steel (indoors) or cast metal (exterior or damp locations) construction, conforming to National Electrical Code, with screw-on cover.
    2. Flush Mounted Pullboxes: Provide overlapping covers with flush-head retaining screws, finished in light grey enamel.
    3. Box volumes shall meet NEC for size and number of entering conduits.
    4. In-Ground Pullboxes: In-ground pullboxes shall be suitable for specific application and as required by respective utility provider. See plans for typical types and locations.
  - E. Junction boxes: Minimum four inch square by 1-1/2 inch deep. In finished areas provide with two gang device cover and matching blank finish plate.

- F. Floor boxes: See Section 16140 – Wiring Devices and Floor Boxes.
- G. Weatherproof Outlet Boxes:
  - 1. Provide corrosion-resistant cast metal weatherproof outlet wiring boxes, of the type, shape and size, including depth of box, with threaded conduit ends, cast metal face plate with spring-hinged waterproof cap suitably configured for each application, including face plate gasket and corrosion proof fasteners.
  - 2. Weatherproof boxes to be constructed to have smooth sides, gray finish.
  - 3. Boxes used in contact with soil shall be cast iron alloy with gasketed screw cover and water-tight hubs.
  - 4. Weatherproof Plates: Cast metal, gasketed, for switches and receptacles provide spring-loaded doors.
- H. Weatherproof Junction and Pullboxes:
  - 1. Provide galvanized sheet steel junction and pullboxes, with screw-on covers; of the type, shape and size, to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws and washers.
- I. Knockout Closures: Provide three (3) piece punched-steel knockout closures.

#### 2.15 Fasteners

- A. Provide approved fasteners for each specific application. Hammer-driven and trigger-fired anchors may be used only after obtaining specific written authorization from Architect.
  - 1. Wood: Wood screws or screw-type nails.
  - 2. Hollow masonry block: Toggle bolt.
  - 3. Concrete or Brick: Expansion bolts. For new concrete work use cast-in-place inserts.
  - 4. Steel: Machine screws, welded threaded studs, heat-treated or spring steel tension clamps.

#### 2.16 Outlet box supports:

- A. Wood stud walls: Adjustable bar hangers with "C" channel cross section Steel City 6010 series, or approved, or mounted on solid blocking. Four inch square boxes adjacent to wood studs may be side nailed and back braced with Steel City No. 50 box brace.
- B. Metal studs: Caddy Bar Hanger Assembly BHA or Caddy MSG or MSF metal stud clips.
- C. Concrete or masonry walls where boxes are not cast in place: Flush anchors, power actuated anchors, hammer driven trigger fired anchors, or concrete inserts.
- D. Flush ceiling outlets: Steel City 6010 series or equal bar hangers.

#### 2.17 Conduit supports:

- A. One hole malleable straps, Steel City, Appleton, T&B, Diamond, Raco, or approved.
- B. Conduit clips: Caddy, Raco or approved.
- C. Nail-up straps: 1/2 inch thru one inch Raco 2252, 2253, 2254, or approved.
- D. Adjustable hangers 1-1/2 inch conduits and larger: Steel City C-149 with threaded steel rod of proper size.
- E. Adjustable trapeze hangers to support groups of parallel conduits: Steel City B-905 steel channel, H-119 square washer, C-105 strap threaded rod. Components of Unistrut, Globe Strut, Harvey Alstrut, or approved.
- F. Drive ring spacing supports for open wiring, Diamond 800 series, or approved. Size as required by number of conductors installed.

- 2.18 Hanger rod attachments: Side Beam Connector, Kindorf E-244; 90 degree fitting, Kindorf B-916; clamp type anchor clips Kindorf Type "C", Unistrut P2675 or approved; spot type concrete insert Kindorf B-255 with "Galv-Krom" finish.
- 2.19 Support channels: Kindorf B-905 with Galv-Krom finish, and C-105 single bolt channel pipe straps.

### **PART 3 - EXECUTION**

#### **3.01 Conductors**

- A. Circuiting. Install branch circuiting exactly as shown. Conduit may be routed at Contractor's best judgment unless directed otherwise. Home runs are diagrammatic for clarity, and may be grouped as desired. Size conduits accordingly with capacity for 25% future fill.
- B. Feeder conductors: Wires shall be factory color-coded by integral pigmentation. Colored plastic tape permitted on No. 6 and larger where integral pigmentation impractical. Apply tape in spiral half-lap over exposed portions in manholes, boxes, panels, switchboards and other enclosures.
- C. All circuit conductors shall be identified with circuit number at all terminals, intermediate outlets, disconnect switches, circuit breakers, motor control centers, etc. Both ends of a given conductor shall be identified alike.
- D. Install wire in conduit runs after concrete and masonry work is complete and after moisture is swabbed from conduits. Leave six-inch single wire pigtails for connection of fixture leads and devices to branch circuits.
- E. Neatly bundle and tie with cable ties conductors in panel gutters, wire gutters, motor control centers, dimmers, etc. where multiple conductors run in accessible wireways. Spacing as required to neatly group and support conductors.
- F. Quantity of conductors shown in any one raceway is not to be increased without specific permission of Engineer.
- G. Install control conductors in separate raceways unless otherwise noted.
- H. Alarm and Detection System: Color code conductors as directed by equipment manufacturer. Where sufficient number of colors are not available to provide separate color for each item, provide W.H. Brady wire markers (or approved equal) on conductors marked similarly at all terminals and connections.
- I. Raceway for low voltage NEC Class II wiring will be required only in walls, air plenums, inaccessible ceiling, and areas where conductors might be exposed to physical damage. Cables approved for use in air plenums and non-combustible ceilings will be accepted in lieu of conduits in plenums or non-combustible ceilings. Cables installed in cable tray shall be approved for such use. All low voltage cable must be suitable for the conditions in which it will be used. Prior to purchasing or installing any cable, confirm with the Mechanical Contractor which areas, if any, require plenum rated cable.

#### **3.02 Raceways**

- A. General Installation:
1. In general, install raceways concealed in construction except where shown otherwise on the Drawings or unless specifically approved by Architect or Engineer.
  2. Unless otherwise noted, size raceways in accordance with Table in Appendix C of NEC for type "THW" conductors regardless of type of conductor specified.
  3. Two or more conduits using the same routing: Mount on channel support system. Unistrut or approved.
  4. Provide pull line and cap off watertight each empty conduit provided for future installation of wiring.



5. Conduit stubbed from a concrete slab or wall to serve an outlet under a table or to supply a machine shall have a rigid conduit coupling flush with the surface of the slab. Provide plug where conduit is to be used in future.
  6. Allow minimum of 6 inches clearance at flues, steam pipes, and heat sources. Do not run conduits beneath boilers or heating units.
  7. Dissimilar Metals: Avoid contact with pipe runs of other systems.
- B. Lengths and Bends:
1. Maximum number of bends in any run shall be the equivalent of three (3) 90 degree bends (270 degrees total). Maximum length of any run shall be 100 feet, except as allowed in underground installations.
  2. Junction and pull boxes shall be provided to maintain these limits. Do not locate pull boxes or junction boxes in finished areas unless specifically shown or special permission is obtained from Architect or Engineer.
- C. Exposed raceways:
1. In finished areas run parallel with or at right angles to building structural lines and closely follow surfaces wired over. Conduits offset at panels, outlets, junction boxes, etc. Conduit 1-1/2 inch and larger suspended at locations as directed by Architect or Engineer.
  2. In accessible void and furred spaces, conduit may be run in a direct line between outlets with long sweep bends and offsets closely following surfaces wired over. Suspend conduit 1-1/4 inch and larger to be run to allow maximum access to space and located as directed by Architect or Engineer.
  3. For exposed runs, attach surface mounted conduit with clamps. Where conduit runs along the inside of exterior walls, mount to channel-type strut at required spacing.
- D. Concealed raceways:
1. At inaccessible areas, raceways may be run in a direct line with long sweep bends and offsets. In cavity walls, run conduit in hollow spaces and do not chase interior or exterior masonry.
  2. At accessible areas above lift-out or accessible ceiling areas, run conduit on top or bottom of lower cords or trusses or on underside of roof. Vertical extensions for wiring to ceiling outlets and fixtures kept to minimum length.
- E. Raceways in Concrete Slabs:
1. Do NOT install conduit larger than one inch maximum in concrete slabs unless specifically shown or approved.
  2. Conduits in above grade slabs shall be located in the middle of the slab. Conduit installed in any concrete slab shall have a minimum two (2) inch cover. The maximum size, spacing, and location of conduits in post-tensioned slabs shall be subject to approval by the structural engineer. Conduits larger than one inch shall not be run in slabs.
  3. Space no less than 8" on center and as far apart as possible where converging at panelboard locations.
  4. Do not interfere with placement of re-bar. Place raceway under rebar layer. Spacing not less than eight (8) inches on center, or as required and as wide as possible where converging at panels, etc. Adequately secure raceway, boxes, inserts, etc. by mechanical means or suitable adhesive prior to pour.
  5. Cap and securely support conduits prior to concrete pour.
  6. Stub-Ups:

- a. Install rigid galvanized conduit, Schedule 80 PVC or Fiberglass conduit with threaded coupling set flush with finished floor. Seal with flush, threaded pipe plug.
  - b. Where stub-up extends above floor, install conduit at such depth that no curved section of the elbow is exposed.
- F. Expansion Joints:
- 1. All conduits crossing expansion joints where cast in concrete shall be provided with expansion-deflection fittings, equivalent to OZ/Gedney AXDX, installed per manufacturers recommendations.
  - 2. All conduits three inches and larger where not cast in concrete shall be rigidly secured to the building structure on opposite sides of a building expansion joint with an expansion-deflection fitting across the joint, equivalent to OZ/Gedney AXDX, installed per manufacturer's recommendations.
  - 3. All conduits less than three inches where not cast in concrete shall be provided with junction boxes securely fastened on both sides of the expansion joint, connected together with 15 inches of slack (a minimum of 15 inches longer than the straight line length) flexible conduit with copper green ground bonding jumper. In lieu of this flexible conduit, an expansion-deflection fitting, as indicated for conduits three inch and larger, may be installed.
- G. Seismic Joints:
- 1. No conduits cast in concrete shall be allowed to cross a seismic joint.
  - 2. All conduits shall be provided with junction boxes securely fastened on both sides of the expansion joint, connected together with 15 inches of slack (a minimum of 15 inches longer than the straight line length) flexible conduit with copper green ground bonding jumper. Prior to installation, verify with Architect that the 15 inches is adequate for the designed movement, and if not, increase this length as required.
- H. Underground raceways:
- 1. Use galvanized rigid steel, fiberglass or Schedule 40 (or 80) PVC with galvanized rigid steel or fiberglass elbows and risers.
  - 2. Maximum length of any run shall be 300 feet, less 50 feet for each equivalent 90-degree bend.
  - 3. Install underground marking tape buried 6-8 inches below grade, directly above conduit.
  - 4. Run in a direct line with long sweep bends.
  - 5. Raceways inside of building run below slab in gravel fill.
  - 6. Burial Depth – Secondary Service:
    - a. Rigid Galvanized: Minimum 24-inches below finish grade, unless noted otherwise.
    - b. PVC: Where installed under roadways or areas subject to heavy traffic provide a minimum of 36-inches of cover. All other locations, minimum 30-inches below finish grade, unless noted otherwise.
  - 7. Burial Depth – Primary Service: Minimum 48-inches below finish grade or as required by serving utility.
  - 8. All underground raceways to be made water-tight with sealed threads or couplings.
  - 9. Rigid Galvanized conduit shall be coated entire length with coal-tar material (Koppers Bitumastic 515) or with PVC jacket (15 mil. Minimum).
- I. Penetrations, Seals & Plugs
- 1. All 90 degree ells and conduit entrances into buildings to be with rigid galvanized conduit. Coat with coal-tar material (Koppers Bitumastic 515)

2. Provide conduit seals at exits and entrances from hazardous locations (i.e. Chlorine storage or distribution rooms), freezer rooms and other locations as required by NEC Article 500.
  3. Conduit penetrations of the electrical room walls and floor must "float" via backer rod or fiberglass and caulked air tights.
  4. Provide conduit plugs at all raceway openings during roughing-in to prevent entrance of foreign matter.
  5. Provide floor or wall entrance fittings at all points where raceways enter or exit below finish grade at tunnels, basements or trenches.
  6. Any conduit leaving the building envelope (e.g., site lighting, roof mounted HVAC equipment, etc.) to be 3/4-inch minimum and must slope downward. Seal conduits at interior side of building. Pack non-hardening duct sealing mastic around wires in the raceway.
  7. Provide wall or floor fire and smoke barriers to cut off all concealed draft openings (both vertical and horizontal) where raceways perforate fire walls.
  8. Roof Penetrations:
    - a. Provide roof-flashing assembly at locations where conduit pierces the roof.
    - b. Locate conduit minimum six inches from roof curbs or flashing.
    - c. Provide caulking compound between counter flashing and conduit for watertight seal.
- J. Multi-outlet surface raceways:
1. In general, raceways to extend full length of wall or cabinet at locations indicated.
  2. See Architectural elevations and Electrical Drawings for locations and installation requirements.

### 3.03 Metal Clad Cable:

- A. Permitted metal Clad Cable Uses:
1. Metal Clad cable shall only be used for concealed branch circuit interior wiring and may be exposed only in unfinished crawl spaces or attics. It shall not be used in inaccessible ceiling areas.
  2. Metal Clad cable shall not be used for branch circuit home runs. Home runs shall be installed using conduit and conductor method from the circuit breaker panel to a junction box in the nearest accessible ceiling to the point of usage. From the junction box, Metal Clad cable may be used to each device or light. Metal Clad cable shall not be allowed from device to device.
- B. Support horizontal and vertical cable six feet on center (maximum) and within six inches of boxes with approved cable clamps. Cables shall not rest on accessible ceiling tiles. Attach cables with metal clips or plastic cable ties to support wires from structure. Cable shall not be supported from, or come in contact with, mechanical ducts, water, sprinkler or gas piping; maintain six inch separation minimum.
- C. Cable shall be cut with manufacturer-approved devices.
- D. Junction Boxes: Splice conductors only in accessible junction boxes. Provide junction box at all cable penetrations of wall, ceiling or floor surfaces for equipment connections; cable shall not be run directly through finished surfaces. Provide junction box at transition from concealed to exposed wiring. Provide junction box at transition from interior to exterior wiring.
- E. Voltage Drop: Conductors over 75 feet for 120 volt, for branch or individual circuit home runs from equipment connection, receptacle or lighting fixture shall be No. 10 AWG minimum.
- F. Where cable penetrates fire-rated walls or floors, provide mechanical fire stop fitting with UL listed fire rating equal to wall or floor rating.

### 3.04 Boxes

- A. Verify location of all outlet boxes with actual field conditions and plans to avert possible installation conflicts. Architect or Engineer reserves the right to make minor changes prior to installation without cost to the Owner. Coordinate work with that of other trades.
- B. Toe Spaces: Boxes for receptacle outlets in toe spaces to be mounted horizontally.
- C. Above Counter: Boxes for devices above counter should be typically mounted vertically, however, due to unforeseen field modification in casework and backsplashes, please coordinate with the architect.
- D. Extension rings: Do not add more than one to any box with maximum depth of box and extension ring not to exceed three inch unless specifically indicated otherwise.
- E. Boxes and pendants for surface-mounted fixtures on suspended ceilings shall be supported independently of the ceiling supports.
- F. In open overhead spaces, cast metal boxes threaded to raceways need not be separately supported except where used for fixture support. Cast metal boxes having threadless connectors and sheet metal boxes shall be supported directly from the building structure or by bar hangers.
- G. Where bar hangers are used, the bar shall be attached to raceways on opposite sides of the box and the raceway shall be supported with an approved fastener not more than 24 inches from the box.

### 3.05 Hangers and Support

- A. Provide independent support to building structural members for all electrical fixtures, materials, or equipment installed in or on ceilings, walls, void spaces, and over furred or suspended ceilings. Supports shall be designed for a minimum of four times the weight of equipment including hangers.
- B. Other crafts' fastening devices shall not be used for the supporting means of electrical equipment, materials or fixtures. Supports and/or fasteners shall not be used to support more than one particular item.
- C. Vertical support members for equipment and fixtures shall be straight and parallel to building walls.
- D. Hammer driven trigger fired and power actuated anchors may not be used in the following locations at concrete construction: In slabs or walls less than four inch thick; in joist or beams, including concrete waffle slabs which are less than eight inch wide; within three inches of any edge or opening; in pre-stressed concrete without prior approval of the Engineer unless specifically indicated otherwise.
- E. Exact location and spacing between supports per manufacturer's recommendations and NEC requirements as minimum.
- F. Fiber anchors, lag shields, perforated tape or wire not permitted unless otherwise indicated.
- G. Raceways
  - 1. Support conduits within 18 inches of outlets, boxes, panels, cabinets, couplings, elbows, and deflections. The maximum distance between supports shall not exceed ten foot spacing.
  - 2. Conduit up to and including 1-inch EMT may be supported from ceiling fixture wires by conduit clips or other approved devices only with written approval of the installer of the ceiling support system. All other conduit runs shall be secured to the structure by two-hole straps or supported on Kindorf or Unistrut hangers. Wire will not be permitted for supporting conduit. All visible conduit runs will be parallel to the building structural lines.
  - 3. Anchor conduit install in poured concrete to the steel reinforcing with No. 14 black iron wire.
  - 4. In partitions of light steel construction, sheet metal screws may be used, and bar hangers may be attached with saddle-suspended ceiling construction only. Lighting system branch circuit raceways shall be fastened to the ceiling supports.
  - 5. Support suspended feeder conduits by metal ring or trapeze hangers with threaded steel rods. Wire ties to prevent displacement, using not less than No. 14 iron wire, may be used only for concealed runs in concrete for conduit up to 1 ¼ inch.

6. Support all conduit within 18 inches of each box, coupling, elbow and panel at spacing of not more than ten feet along runs.
7. At Main Distribution, Subdistribution and surface mounted branch panels and cabinets where conduit exit from the top, provide support channels on wall 24-inch above panel and at six feet intervals from thereon for support of conduits.
8. Layout to maintain headroom, neat mechanical appearance, and to support equipment loads required.
9. Conduit shall be installed in such a manner as to prevent the collection of trapped condensation. All runs of conduit shall be arranged to avoid of traps wherever possible.

3.06 Cleaning

- A. Complete raceways system before pulling-in conductors.
- B. Remove all foreign matter from raceways and blow out or vacuum smaller conduits and pull mandrel through larger conduits prior to installing conductors.

3.07 Painting

- A. All exposed conduits on painted walls to be painted to match wall and trim colors.

END OF SECTION

BLANK PAGE

**SECTION 26 0526  
GROUNDING AND BONDING**

**PART 1 - GENERAL**

**1.01 Summary**

- A. Provide a complete grounding system for all electrical equipment in accordance with NEC Article 250 and established safety practices.
- B. Provide grounding grid at pad-mounted transformers.
- C. Provide a main grounding electrode consisting of a bare No. 4 copper grounding electrode conductor connected to a concrete-encased electrode. Concrete-encased electrode provided by others. See detail on Architectural Drawings.
- D. Provide a complete grounding electrode system. All building electrodes must be tied into this system per 250.50 of the NEC. These building electrodes are: the main concrete-encased electrode, any metal underground water pipe that is in direct earth contact for at least ten feet, and the metal frame of the building where effectively grounded.
- E. The grounding electrode system is to include, but is not limited to: grounding conductors, fitting connectors and all other devices and material as required rendering the system complete.

**1.02 Related Work In Other Sections**

- A. Providing conductors, Section 26 0523, Conductors and Cables.
- B. Providing raceways, Section 26 0533, Raceways and Boxes.

**1.03 Quality Assurance**

- A. UL listed.

**PART 2 - PRODUCTS**

**2.01 Materials**

- A. Ground connectors: Bronze clamp type. All clamp accessories such as bolts, nuts and washers shall also be bronze to assure a permanent corrosion resistant assembly. Bolts used to fasten lugs to enclosures must be case hardened and sized for lug hole and hole drilled into enclosure. O-Z Gedney, Burndy, IlSCO or approved.
- B. Ground rod clamps: Exothermic welding type or one piece cast bronze with safety set screw. Cadweld "G" series, Copperweld 6500 series, or approved.
- C. Ground rods: Copper or steel core copper covered, minimum 5/8 inch by 10'-0". Copperweld 9400 series, or approved.
- D. All ground cable splices and joints to be made with an exothermic welding process that shall provide a weld with current-carrying capacity not less than that of the conductors welded. Soldered connections not to be used.

**PART 3 - EXECUTION**

**3.01 Installation**

- A. Install in accordance with NEC Article 250.
- B. Except where specifically indicated otherwise, all exposed non-current carrying metallic parts of electrical equipment to be bonded together to limit any difference of potential voltage. Metallic raceway systems may be considered the equipment grounding system where specifically noted or where approved in the NEC. Equipment grounding conductors must be installed in all non-metallic conduit systems. All load side equipment to have the neutral system isolated from the equipment grounding system. The equipment grounding system must provide a low impedance path from the equipment back

to the source equipment-grounding bar. This equipment-grounding bar to be connected to the system neutral at the source by a main bonding jumper sized per NEC 250.28, 250.102, and 250.168. The equipment grounding conductors to be sized at least as large as required by NEC 250.122.

- C. The grounding electrode system to connect to the service neutral, if required, or to the system grounded conductor if a neutral is not required. The electrode system may terminate on the equipment-grounding bar at the main service where a properly sized main bonding jumper has been installed. Water system bonding must utilize the proper size water pipe bond clamp to match the size of the water pipe.
- D. Electrical Equipment Grounding (Safety Ground):
  - 1. Ground non-current carrying metal parts of electrical equipment enclosures, frames, man-holes, conductor raceways or cable trays to provide a low impedance path for line-to ground fault current and to bond all non-current carrying metal parts together.
  - 2. Equipment grounding conductor to be electrically and mechanically continuous from the electrical circuit source to the equipment to be grounded. Size ground conductors per NEC 250.122 unless larger conductors are shown on drawings.
  - 3. Grounding conductors to be identified with green insulation. Where green insulation is not available, on larger sizes, black insulation to be used and suitably identified with green tape at each junction box or device.
  - 4. Install metal raceway couplings, fittings and terminations secure and tight to ensure good ground continuity. Provide grounding bushing and bonding jumper where metal raceway is not directly attached to equipment metal enclosure, at concentric knock-outs, or at concentric or eccentric knockouts for circuits of over 250v to ground.
  - 5. Lighting fixtures to be securely connected to equipment grounding conductors. Outdoor lighting standards to have a factory installed ground lug for terminating the ground wire.
  - 6. Motors to be connected to equipment grounding conductors with a conduit ground bushing and with a bolted solderless lug connection on the metal frame. A separate equipment-grounding conductor to be run with each motor branch circuit.
  - 7. Bonding to be provided to assure electrical continuity and the capacity to conduct safely any fault current likely to be imposed.
  - 8. All plug-in receptacles to be bonded to the boxes, raceways and grounding conductor.
  - 9. Equipment grounding conductors to be provided for all lengths of flexible metallic conduit. All equipment provided with two conductor cords to be rewired to provide a three-conductor type "S" cord and grounding attachment plug caps.
- E. Neutrals throughout the system to be solidly grounded to one point at the system source.
- F. Lighting and power panelboard to be grounded by connecting a conductor to the grounding stud and to the incoming and outgoing feeder conduits grounding bushings. Each grounding-type bushing to have the maximum ground wire accommodation available in standard manufacturer for the particular conduit size. Connection to the bushing to be with wire of this maximum size.
- G. The grounding stud of each secondary voltage dry type, three phase transformer to be connected separately to the grounding lug on the panelboard serving the transformer. Connection to be by means of an insulated conductor run in conduit, sized as shown on the drawings.
- H. Provide a No. 6 green coded insulated conductor from each telephone terminal board to the closest effectively grounded water pipe or structural steel.
- I. When included as part of the project, the central equipment for the fire detection and alarm system is to have its grounding terminal connected to the ground lug on the panelboard serving the system by means of a No. 6 green coded insulated conductor, run in 3/4 inch metal conduit, utilizing a ground clamp.

### 3.02 Testing



- A. Grounding Electrode Conductor (GEC):
  - 1. Measure resistance between service equipment ground bus and each grounding electrode, using a Megger and a single length of additional wire, if necessary. Measure resistance between both ends of the additional wire used. Isolate and correct any poor connections as indicated.
  
- B. System Ground Continuity:
  - 1. At panels and selected outlets, measure the ground loop resistance between the neutral conductor and raceway using a megger or equivalent. Or, at selected outlets, measure the ground loop impedance using a ground loop impedance tester.
  - 2. Ground loop impedance shall not exceed a value in ohms that is the voltage to ground divided by five (5) times the rated current.
  - 3. Isolate and correct the cause of the poor connection. If the source of the high reading cannot be practically corrected, pull a separate ground conductor into the raceway and re-test.
  - 4. Report findings to Engineer.

END OF SECTION

BLANK PAGE

**SECTION 26 0529  
HANGERS AND SUPPORTS**

**PART 1 - GENERAL**

**1.01 Description**

- A. Provide all seismic bracing (as required for the applicable seismic zone as determined by the Geotechnical Engineer or Architect) of equipment, feeders and other electrical items in accordance with prevailing codes. Produce and submit the required designs, calculations, certifications and stamped drawings to the authority having jurisdiction and obtain their approval prior to installation or fabrication. Comply with latest edition of the SMACNA Seismic Restraint Manual.

**1.02 Submittals**

- A. For loads over 150 pounds: Submit details of proposed system for transfer of hanger loads indicating: Proposed hanger locations, hanger loads, location of other mechanical work and electrical work hangers in vicinity of proposed hangers, spans, materials and sizes of additional framing, and proposed connections to structure shown or Architectural and Structural Drawings.

**PART 2 - PRODUCTS**

**2.01 Fasteners**

- A. Provide approved fasteners for each specific application. Hammer-driven and trigger-fired anchors may be used only after obtaining specific written authorization from Architect.
  - 1. Wood: Wood screws or screw-type nails.
  - 2. Hollow masonry block: Toggle bolt.
  - 3. Concrete or Brick: Expansion bolts. For new concrete work use cast-in-place inserts.
  - 4. Steel: Machine screws, welded threaded studs, heat-treated or spring steel tension clamps.

**2.02 Outlet box supports:**

- A. Wood stud walls: Adjustable bar hangers with "C" channel cross section Steel City 6010 series, or approved, or mounted on solid blocking. Four inch square boxes adjacent to wood studs may be side nailed and back braced with Steel City No. 50 box brace.
- B. Metal studs: Caddy Bar Hanger Assembly BHA or Caddy MSG or MSF metal stud clips.
- C. Concrete or masonry walls where boxes are not cast in place: Flush anchors, power actuated anchors, hammer driven trigger fired anchors, or concrete inserts.
- D. Flush ceiling outlets: Steel City 6010 series or equal bar hangers.

**2.03 Conduit supports:**

- A. One hole malleable straps, Steel City, Appleton, T&B, Diamond, Raco, or approved.
- B. Conduit clips: Caddy, Raco or approved.
- C. Nail-up straps: 1/2 inch thru one inch Raco 2252, 2253, 2254, or approved.
- D. Adjustable hangers 1-1/2 inch conduits and larger: Steel City C-149 with threaded steel rod of proper size.
- E. Adjustable trapeze hangers to support groups of parallel conduits: Steel City B-905 steel channel, H-119 square washer, C-105 strap threaded rod. Components of Unistrut, Globe Strut, Harvey Alstrut, or approved.
- F. Drive ring spacing supports for open wiring, Diamond 800 series, or approved. Size as required by number of conductors installed.

- 2.04 Hanger rod attachments: Side Beam Connector, Kindorf E-244; 90 degree fitting, Kindorf B-916; clamp type anchor clips Kindorf Type "C", Unistrut P2675 or approved; spot type concrete insert Kindorf B-255 with "Galv-Krom" finish.
- 2.05 Support channels: Kindorf B-905 with Galv-Krom finish, and C-105 single bolt channel pipe straps.

### PART 3 - EXECUTION

#### 3.01 Inspection

- A. Examine all equipment locations to determine type of supports required and provide seismic restraints as required.

#### 3.02 Installation

- A. Provide independent support to building structural members for all electrical fixtures, materials, or equipment installed in or on ceilings, walls, void spaces, and over furred or suspended ceilings. Supports shall be designed for a minimum of four times the weight of equipment including hangers.
- B. Other crafts' fastening devices shall not be used for the supporting means of electrical equipment, materials or fixtures. Supports and/or fasteners shall not be used to support more than one particular item.
- C. Vertical support members for equipment and fixtures shall be straight and parallel to building walls.
- D. Hammer driven trigger fired and power actuated anchors may not be used in the following locations at concrete construction: In slabs or walls less than four inch thick; in joist or beams, including concrete waffle slabs which are less than eight inch wide; within three inches of any edge or opening; in pre-stressed concrete without prior approval of the Engineer unless specifically indicated otherwise.
- E. Exact location and spacing between supports per manufacturer's recommendations and NEC requirements as minimum.
- F. Fiber anchors, lag shields, perforated tape or wire not permitted unless otherwise indicated.

#### 3.03 Boxes

- A. Boxes and pendants for surface-mounted fixtures on suspended ceilings shall be supported independently of the ceiling supports.
- B. In open overhead spaces, cast metal boxes threaded to raceways need not be separately supported except where used for fixture support. Cast metal boxes having threadless connectors and sheet metal boxes shall be supported directly from the building structure or by bar hangers.
- C. Where bar hangers are used, the bar shall be attached to raceways on opposite sides of the box and the raceway shall be supported with an approved fastener not more than 24 inches from the box.

#### 3.04 Raceways

- A. Support conduits within 18 inches of outlets, boxes, panels, cabinets, couplings, elbows, and deflections. The maximum distance between supports shall not exceed ten foot spacing.
- B. Conduit up to and including 1-inch EMT may be supported from ceiling fixture wires by conduit clips or other approved devices only with written approval of the installer of the ceiling support system. All other conduit runs shall be secured to the structure by two-hole straps or supported on Kindorf or Unistrut hangers. Wire will not be permitted for supporting conduit. All visible conduit runs will be parallel to the building structural lines.
- C. Anchor conduit install in poured concrete to the steel reinforcing with No. 14 black iron wire.
- D. In partitions of light steel construction, sheet metal screws may be used, and bar hangers may be attached with saddle-suspended ceiling construction only. Lighting system branch circuit raceways shall be fastened to the ceiling supports.

- E. Support suspended feeder conduits by metal ring or trapeze hangers with threaded steel rods. Wire ties to prevent displacement, using not less than No. 14 iron wire, may be used only for concealed runs in concrete for conduit up to 1 ¼ inch.
- F. Support all conduit within 18 inches of each box, coupling, elbow and panel at spacing of not more than ten feet along runs.
- G. At Main Distribution, Subdistribution and surface mounted branch panels and cabinets where conduit exit from the top, provide support channels on wall 24-inch above panel and at six feet intervals from thereon for support of conduits.
- H. Layout to maintain headroom, neat mechanical appearance, and to support equipment loads required.
- I. Conduit shall be installed in such a manner as to prevent the collection of trapped condensation. All runs of conduit shall be arranged to avoid of traps wherever possible.

END OF SECTION

BLANK PAGE

**SECTION 26 2400  
SWITCHBOARDS AND PANELBOARDS**

**PART 1 GENERAL**

**1.01 Description**

- A. This Section shall include furnishing and installing switchboards, sub-distribution, and branch circuit panelboards with components as indicated. Incorporate switching and protective devices of the number, ratings and type shown and noted herein.
- B. Switchboards to include necessary interconnections, instrumentation and control wiring for a complete and satisfactory operating system.
- C. All panelboards and breakers to be fully-rated, Series rated panel boards and breakers are not acceptable.

**1.02 Related work in other sections includes:**

- A. Providing concrete housekeeping pad for floor-mounted equipment under Division 03.
- B. Providing identification, Section 26 500, Basic Electrical Materials and Methods.
- C. Providing cable ties and lugs, Section 26 0519, Conductors and Cables.
- D. Providing grounding, Section 26 0526, Grounding and Bonding.

**1.03 Quality Assurance**

- A. American National Standards Institute (ANSI).
  - 1. 67 Panelboards (ANSI/UL 67).
  - 2. C37.20 Switchgear Assemblies Including Metal-Enclosed Bus (ANSI/IEEE C37.20).
  - 3. ANSI Z55.12 gray finishes for industrial apparatus and equipment.
- B. Institute of Electrical and Electronics Engineers (IEEE).
  - 1. Std. 141-76 Electric Power Distribution for Industrial Plants.
  - 2. Std. 241-74 Electric Systems for Commercial Buildings.
- C. National Fire Protection Agency (NFPA).
  - 1. NFPA 70 National Electrical Code.
- D. Underwriters' Laboratory (UL).
  - 1. UL 50: Cabinets and Boxes.
  - 2. UL 67 Panelboards.
  - 3. UL 869: Service Disconnects.
  - 4. UL 891: Dead-Front Switchboards.
- E. National Electrical Manufacturers Association (NEMA)
  - 1. NEMA AB-1: Molded Case Circuit Breakers.
  - 2. NEMA KS-1: Enclosed Switches.
  - 3. NEMA PB-2: Dead-Front Distribution Switchboards.
  - 4. NEMA SG-5: Switchgear Assemblies.
  - 5. Test Switchboards in accordance with NEMA PB2 requirements.
  - 6. Standards for Panelboards.
- F. Federal Specification W-C-375B/GEN for Switchboards.

#### 1.04 Submittals

- A. Shop Drawings
  - 1. Submit complete shop drawings with dimensions, components and internal connections in accordance with Division 01 or Section 26 0500, Basic Electrical Materials and Methods (when included).
- B. Switchgear: Submit shop drawings showing following:
  - 1. Bus ratings and arrangement.
  - 2. Frame size, trip setting, and interrupting rating of overcurrent devices.
  - 3. Manufacturer's recommended settings of time delays and ground fault sensing adjustments of adjustable circuit breakers which demonstrate selective coordination.
  - 4. Fault bracing rating of total assembly.
  - 5. Elementary wiring diagrams for metering and relay protection.
  - 6. Scale ranges of meters.
  - 7. Dimensioned elevation and plan views.
  - 8. Indicate top and bottom conduit entrance areas and dimensions.
  - 9. Estimated short circuit minimum 22,000 AIC unless noted otherwise in drawings.
- C. Submit operation and maintenance data in accordance with Division 01 or Section 26 0500, Basic Electrical Materials and Methods (when included).

#### 1.05 Product Delivery, Storage And Handling

- A. Deliver with UL label and bearing manufacturer's name. Provide all equipment and each section with appropriate UL labels located in conspicuous places. Provide readily accessible nameplates.
- B. Provide starters in manufacturers original cartons with labels intact.
- C. Panelboard exterior trim separately packed to prevent damage during delivery and storage on site.
- D. Upon receipt-open shipping carton and inspect for physical damage. Open switchgear and check interior condition. Prepare a written report of any damaged or unacceptable conditions.
- E. Store and handle panelboards so as not to subject panels to corrosion or mechanical damage and in a manner to prevent damage from environment and construction operation. Keep switchboards wrapped or otherwise protected with plastic and stored on wood pallet on floor.

### PART 2 PRODUCTS

#### 2.01 Branch Circuit Panelboards:

- A. Type:
  - 1. NQOB for 120/208-volt panelboards with bolted breakers having minimum interrupting capacity of 22,000 amperes RMS symmetrical, unless noted otherwise at the bottom of the panel schedules. Breaker trip sizes and number of poles as indicated on the Drawings.
- B. Bussing:
  - 1. Copper or aluminum.
  - 2. Tap Arrangement: Phase sequence type, permitting a two (2) or three (3) pole breaker to be installed at any location.
  - 3. All bolts used to connect current-carrying parts together shall be accessible for tightening from the front of the panel.
  - 4. Wiring terminals: Compression or set screw type for copper conductors; bolted to bus.



- C. Construction: Flush or surface mounted as indicated with following:
  - 1. Door with lock all keyed alike. National No. 68-226 flush panel.
  - 2. Flush mounted panels: Concealed mounting hardware for exterior trim and door. No exposed fastenings or holes permitted. Flush mounted panel located side by side are to be of same length unless otherwise indicated. Flush panels of depth greater than available wall thickness provided with box type exterior trims with edges returned to wall. Depth of return as required making up difference in depth between panel and available wall depth. Panelboards 400 amp or less shall not exceed 6" depth.
  - 3. Surface mounted panels: Completely metal enclosed. Exposed trim fastenings and hardware permitted. Surface mounted panels located side by side to be same height and depth.
  - 4. Gutters minimum of five inch with six inch required at feeder end of panel or where feeder runs inside of gutters. Separate feeder lugs and terminals for each feeder connection with lugs as specified in Section 26 0519 Conductors and Cables. Split door split bus panels provided with two-inch separation of sections.

2.02 Sub-distribution panels:

- A. Flush or surface mounted as indicated on Drawings.
- B. Provide nameplate reading "SUBDISTRIBUTION PANEL 4A1, etc." and separate nameplate at each section indicating voltage and phase.
- C. Finish industrial gray on all exposed surfaces.
- D. All other items to be as specified for branch circuit panelboards.
- E. Similar to Square D I-line series.

2.03 Circuit Breakers

- A. See additional specific requirements under Switchboard Section.
- B. Multiple breakers common trip.
- C. Combination breaker and ground fault interrupter: 10,000 amps or 20,000 IC rated, bolted connection.
- D. Location of circuit breakers in panels: Install circuit breakers in panels at locations as indicated in the panel schedules.
- E. Main breaker, when so equipped, shall be individually mounted separate from branch breakers. Where used as service disconnect, breaker and panelboard shall be listed for use as service entrance equipment.
- F. Branch circuit breakers shall be bolt-on.
- G. Provide circuit breaker handle guards to prevent accidental shut-off of equipment for breakers supplying obviously constant circuits for clocks, time switches, refrigeration, freezers, sound systems, fire alarm and other like systems as directed.

2.04 Identification:

- A. Panelboards: In accordance with Section 26 0500. Locate nameplates attached to top center of interior trim. Nameplate to indicate panel, voltage and phase characteristics such as Panel 2AA, 120/208 volt, three phase. Panel labeling to correspond to distribution system labeling.
- B. Circuit breakers: Number circuit breakers as indicated in panel schedules. Numbers engraved and filled in interior trim or permanently attached metal numbers equal to Wilson Heard markers or plastic numbers. Adhesive backed printed numbers not approved. Other methods of numbering as approved by Engineer.
- C. Provide typewritten circuit schedules for panelboards, cross-connect panels and terminal cabinets. Schedules shall be covered with minimum of 0.018-inch thick clear rigid plastic installed in permanent-

ly attached metal frame holder located on inside face of door. Schedules to use final assigned room names/numbers, loads not plan designations.

- D. When making modifications to existing equipment or panelboards, provide labels as indicated in this section. Provide new typewritten circuit schedules for all modified panelboards.

#### 2.05 Panel finish:

- A. All panels shall be provided with a rust-inhibiting phosphatized primer coating approved by the paint manufacturer.
- B. At all finished areas factory finish to match adjacent surfaces. Rodda Baking Enamel.
- C. In unfinished or utility areas standard factory industrial gray.
- D. Paint sides, top and front of surface mounted panels.

#### 2.06 Lugs:

- A. In accordance with Section 26 0519, Conductors and Cables.
- B. Compression or set-screw type, bolted to bus or CB output.
- C. Provide double or feed thru lugs at panels where feeders are extended to additional panels.
- D. Provide double capacity neutral lugs for all panelboards having an isolated bus.
- E. Provide oversized lugs as required for aluminum panel feeders to accommodate sizes shown in feeder schedule on drawings.

- 2.07 Acceptable Manufacturers: Square-D, GE, Cutler-Hammer, or approved. For electronic grade panelboard suppression/filter system: GE, Current Technologies, Liebert, or approved.

### PART 3 EXECUTION

#### 3.01 Inspection

- A. Coordinate NEC clearance requirements space provided to assure adequate clearances are maintained. Notify Engineer if space provided is inadequate for specified equipment and/or for maintaining required code clearances. Do not order equipment until any space inadequacies are resolved.

#### 3.02 Installation

- A. Prior to installation of switchgear and transforming layout the electrical rooms and obtain approval of the layout from the code authority having jurisdiction.
- B. Install panelboard in accordance with manufacturer's written instructions.
- C. Furnish and install three spare one-inch conduits from the top of each recessed panel, to an accessible point above the ceiling.
- D. Conduit shall be securely fastened to all panelboards and sheet metal outlet, junction, and pull boxes with galvanized locknuts, and one bushing installed in accordance with standard practice. The full number of threads shall project through to permit the bushing to be drawn tight against the end of the conduit, after which the locknut shall be made up sufficiently tight to draw each into firm electrical contact with the box.
- E. Do not install exterior trims until finish painting is completed. Clean interior of panel (construction dust, paint over-spray, etc...) prior to installation of exterior trim.
- F. Keys: Collect all panel keys. Combine all keys on one key ring and submit at time of substantial completion.
- G. No low voltage wiring (less than 120 volt) to be installed in panel enclosures.
- H. Breaker handle guards shall be provided on each circuit supplying obviously constant loads to prevent accidental shutting off. Such loads are refrigeration, contactor controlled circuits, freeze protection, etc.

- I. Care shall be taken to terminate ground conductors from isolated ground receptacles only on the isolated ground bus in a panel. Do not terminate bonding conductors on an isolated ground bus.
  - J. Bolt panelboards to wall structure as required for appropriate seismic zone. Provide adequate backing as required.
  - K. All nameplates, labels, screws, bolts, or other hardware shall be in place prior to acceptance.
  - L. Install floor-mounted equipment on a three-inch high concrete pad extending three inches beyond front and sides of said equipment. Level and securely fasten equipment to concrete pad.
  - M. Provide four-foot wide rubber insulation mats on floor in front of switchboard for its entire length.
- 3.03 Power One-Line Diagram
- A. Mount one-line diagram from Plans at main distribution assembly. Use a clean copy and mount under clear plastic cover, set in a metal frame.
- 3.04 Field Test
- A. Prior to energizing distribution equipment, perform following test and adjustments according to manufacturer's recommendations and instructions.
  - B. Continuity check.
  - C. Insulation level (megger) tests.
  - D. Short circuit test.
- 3.05 Adjustment And Cleaning
- A. Tighten bus connections and mechanical fasteners. Check bus-to-bus and breaker-to-bus connection for correct torque tightening.
  - B. Tighten feeder and circuit breaker connections as recommended by the manufacturer.
  - C. Clean all foreign matter from interior and exterior of equipment and touch-up scratched or marred surfaces to match original finish.
  - D. Adjust interior trim to fit tight against exterior trims.
  - E. Check all moving mechanical parts for proper operation.

END OF SECTION

BLANK PAGE

**SECTION 26 2730**  
**WIRING DEVICES, FLOOR BOXES & CONTROLS**

**PART 1 - GENERAL**

**1.01 Description**

- A. Provide all wiring devices and finish plates as required unless specifically indicated otherwise.
- B. Related work in other sections includes:
  - 1. Providing identification, Section 26 0500, Basic Electrical Materials and Methods.
  - 2. Providing conductors, Section 26 0519, Conductors and Cables.
  - 3. Providing boxes, Section 26 0533, Raceways and Boxes.

**1.02 Quality Assurance**

- A. American National Standards Institute (ANSI): 467 Grounding and Bonding Equipment (ANSI/UL467). 498 Attachment Plugs and Receptacles (ANSI/UL498). C73 Series Dimensions of Attachment Plugs and Receptacles.
- B. Federal Specification (FS): Electrical Power Connector, Plug, Receptacle and Cable Outlet. W-C-596D, E and F. Switches, Toggle (toggle and lock), Flush Mounted WS 896-E.
- C. National Electrical Manufacturer's Association (NEMA): WD 1-79 General Purpose Wiring Devices.
- D. National Fire Protection Association (NFPA): NFPA 70 National Electrical Code.
- E. Underwriters' Laboratory (UL): UL-20 Standard for Snap Switches.

**1.03 Submittals**

- A. Submit product data sheets per Division 01 or Section 26 0500, Basic Electrical Materials and Methods (when included).
- B. Occupancy sensor system submittals shall include:
  - 1. Floor plans, same scale as the electrical drawings, showing device locations, sensor coverage pattern, and sensor type.
  - 2. Wiring diagrams.
  - 3. Mounting details.
  - 4. Complete material list with catalog sheets showing all components to be used in the system.
- C. Submit operation and maintenance data per Division 01 or Section 26 0500, Basic Electrical Materials and Methods (when included).

**1.04 Product Delivery, Storage And Handling**

- A. Deliver with UL label and bearing manufacturer's name in manufacturer's original unopened and undamaged cartons with labels legible and intact.
- B. Store and handle material so as not to subject them to corrosion or mechanical damage and in a manner to prevent damage from environment and construction operation.

**PART 2 - PRODUCTS**

**2.01 Acceptable manufacturers:** Arrow-Hart, General Electric, Hubbell, Leviton, Pass & Seymour or approved.

**2.02 Switches:** Specification Grade, Quiet Type, Minimum rating 120/277 volt, 20 amp unless otherwise noted. Finish color WHITE

- A. Toggle and lock switches: Federal Specifications as listed in Quality Assurance.
  - 1. Single Pole Switch: Arrow-Hart 1991 or approved.

2. Double Pole Switch: Arrow-Hart 1992 or approved.
  3. Three-way Switch: Arrow-Hart 1993 or approved.
  4. Four-way Switch: Arrow-Hart 1994 or approved.
  5. Lock Switch: Corbin Type, Arrow-Hart 1191N or approved.
- B. Momentary contact switch: Three position, two circuit with center "off", 20 amp, 120/277 volt. Arrow Hart 1995; or approved.
- C. Wall Box Dimmers:
1. Modular full wave solid-state unit with integral quiet on-off switch and audible and electromagnetic noise filters.
  2. Thin profile.
  3. 1,000 watt (unless noted otherwise)
  4. 120/277 volt rated.
  5. Lutron Nova-T Vareco NVT-1000 or approved.
- D. Occupancy Sensors:
1. Private Offices: Wall mount, passive infrared, 180n degree, 900 square foot coverage with off override and adjustable from 30 seconds to 30 minutes. Watt-Stopper WS-120 or WS-277, Sensor Switch WS-120 or WS-277 or approved.
  2. Ceiling mounted in restrooms and open office areas: Ultrasonic, 360 degrees, 1000 square foot coverage adjustable from 15 seconds to 15 minutes, with power pack and isolated relay (for HVAC control). Watt Stopper W-1000A (with A120-E or A277-E), Novitas 01-100-071-072 one-way, Sensor Switch (Ultrasonic) or approved.
  3. Wall/ceiling mounted in classrooms: Dual technology (passive infrared and ultrasonic) with integral isolated relay (for HVAC control) 1500 square foot coverage adjustable from 15 seconds to 15 minutes, with power pack and ceiling mount attachment. Watt Stopper DT-100L (with A120-E or A277-E and CM-100), Novitas 01-074-184 (dual technology), Sensor Switch (dual technology) or approved.
  4. Provide occupancy sensors ahead of light switches and tied into Manufactured Wiring System Junction Module (JM) where applicable. Any inter-tie to DDC energy management control system will be by mechanical contractor.
  5. Provide 12" x 12" metal access panels at locations where power packs are installed above inaccessible ceilings.
  6. All occupancy sensor products shall be the same manufacturer.
- E. Time Switches
1. Multi-Circuit Lighting Control
    - a. The electronic time switch shall be a solid-state digital type capable of distributing set points on independent daily schedules throughout a 7-day time period. The time switch shall provide for 5-weekday programming, 2-weekend day programming or all 7-day programming to simplify program entry for typical 5/2-day load control. The time and set points shall be programmable to the nearest minute with a minimum ON duration of 1 minute and a maximum of 6 days, 23 hours and 59 minutes.
    - b. The time switch shall have a digital LED readout and prompt LEDs for each function to further simplify program entry.
    - c. Each load control shall include an ON/OFF pushbutton, an ENABLE/DISABLE switch and an LED load status indicator.

- d. The time switch shall provide an operating temperature range of -40° F (-40°C) to 122° F (50° C).
  - e. Astronomic: The time switch shall provide astronomic programming and momentary or interval programming for any or all circuits independently. Astronomic control shall automatically calculate "center of time zone" times for both sunrise and sunset, and allow user-selectable offset of actual times.
  - f. The time switch shall provide full year control by providing automatic leap year and daylight saving time adjustment. A user selectable override shall be provided for states not observing daylight saving time. The time switch shall also provide holiday or special day control requirements by providing up to 99 holiday schedules. Each of the holiday schedules shall be programmable for a single day or any duration as required. Each holiday schedule shall provide automatic no load activity and shall be independently programmable for a unique load schedule if required.
  - g. A non-volatile memory shall maintain all program data for the life of the time switch without the need for battery backup. The time switch shall include a factory installed lithium battery backup, which shall maintain clock time and calendar data for 8 years minimum. The single coin cell backup shall be user replaceable without removing the field wiring.
  - h. The time switch logic control circuitry shall be isolated and shielded to prevent EMI and RFI interference, for reliable operation in electrically noisy environments. The power board circuitry shall provide protection for transients up to 6,000 volts.
  - i. The time switch shall provide user-selectable 12 hour AM/PM or 24-hour clock formats.
  - j. Enclosure: Verify time switch location and provide appropriate enclosure. The time switch shall be enclosed in a lockable steel enclosure.
  - k. The time switch shall be powered by a user selectable 120, 208, 240 or 277 VAC 50 or 60 Hz source.
  - l. Acceptable Manufacturer: Intermatic ET70000 series or approved.
2. Seven day time switch with carry-over: Provides a different program each day of the week with spring wound 16 hour carry-over in case of power failure. Switch rating 40 ampere resistive or inductive loading, 4 pole single throw, voltage 120/208/240/277 as indicated on the Drawings. Intermatic T7401-02BC. Where flush mounted indoor enclosure with lock and door is called for on the Drawings. Intermatic T7401-02BC-L/
  3. Seven-day dial time switch with spring wound carryover feature, different program for each day of week, 40 ampere, double pole double throw with voltage as indicated, Intermatic T7801 BC surface mounted or approved.
  4. Astro Dial with Carry-Over: Adjusts automatically for seasonal changes with spring wound carry-over mechanism. One setting gives lights "ON" at sunset, lights "OFF" at sunrise or between 8:30 p.m. and 2:30 a.m. all year long. Special cutout dial which can be programmed to skip operation on selected days of the week. Switch rating 40 ampere resistive or inductive loading, four pole single throw, voltage 120/208/240/277 as indicated on the drawings. Intermatic V45471-72 series as required.
  5. Wind-up Timer: Flush mounted, 0-12 hours, without hold feature. Finish plate stainless steel with special engraving to indicate use such as "Heating Control", etc., and hour and minute graduations. Intermatic FF-12H, 20 amp, one HP, 120 volt, or approved.
  6. Automatic Fan Light Switch: Flush mounted single gang toggle switch and time delay relay for operation of fan and room light: "On" position: Light on immediately, fan on within 15 seconds. "Off" position: Light off immediately, fan runs from 4 to 15 minutes determined by the length of time the room has been in use. Pen Zepher Controls Airminder. AM 12, 10 ampere, 120 volt.

F. Photocells

1. Flush mounted photo control with stainless steel finish plate and neoprene gasket, 1800 watt tungsten, 120 volt, Intermatic K-4021, 2000 watt tungsten, 208 volt, Intermatic K4024, 3000 watt tungsten, 277 volt, Intermatic K4033, 3000 watt tungsten 480V, Intermatic K4035.
  2. Conduit mounting, heavy duty, relay type, photo control, 1800 watt tungsten, 120 volt. Intermatic K-4121 or approved.
- 2.03 Receptacles: Specification Grade. Conform to Federal Specifications as listed in Quality Assurance. Finish color WHITE.
- A. Duplex, double parallel slot 20 ampere, 120 volt, typical locations, Arrow-Hart 5362 or approved.
  - B. Ground fault circuit interrupter receptacle: 20 ampere, duplex, double parallel slot, Arrow-Hart GF5362 or approved.
  - C. Tamper resistant 15 ampere, 120 volt duplex receptacle. Arrow-Hart TR82 or approved.
  - D. Flush floor receptacles to be duplex and to have brass, hinged flap lids. Provide carpet flanges in carpeted floors. See also Recessed Floor Boxes.
- 2.04 Flush Floor boxes (non-carpeted areas):
- A. Single gang boxes, flush mounted, fully adjustable, concrete tight formed steel, with rectangular forged brass cover and flange. Shallow type three inch maximum depth with conduit entrances for 1/2 inch and 3/4 inch conduits, Hubbell, or approved. Cat. No. B2429. Deep type four inch maximum depth with conduit entrances for one inch and 1-1/4 inch conduits, Hubbell, or approved, Cat. No. B2427.
  - B. Two gang boxes, flush mounted fully adjustable, watertight cast iron, corrosion-resistant, with rectangular forged brass two gang cover and flange, removable partition between gangs, conduit entrances for 3/4 inch and 1 inch conduits, depth 3-7/16 inch, Hubbell, or approved, Cat. No. B4233. Three gang boxes same as two gang, Hubbell Cat. No. B4333, or approved.
  - C. Covers for rectangular boxes: Brass with requirements as follows:
    1. At 120 volt duplex receptacle locations Hubbell Cat. No. 3625 with two plastic brass finish rings, Hubbell S-3072 (two required at each single gang box).
  - D. Mounting brackets: As required for device installed at each gang.
  - E. Combination power and telephone pedestal floor outlets to consist of two single rectangular flush floor boxes as specified above with Hubbell S-2625 one inch diameter threaded covers. One floor box for 120 volt power and the other for telephone. Pedestal satin aluminum, single kickproof housing with isolated 120 volt and communication compartments. Pedestal with special base without conduit access holes for field modification for connection to flush floor boxes. Telephone compartment with split rubber grommet to allow telephone connectors and cable to be readily installed and to provide space for three amphenol connectors. Square D G-6, Walker 1400 with special base, or approved.
- 2.05 Flush Floor boxes (carpeted areas):
- A. Single gang boxes, flush mounted, fully adjustable, concrete tight formed steel, with round forged brass cover and flange, and round brass customized adjustable duplex type carpet flange Hubbell S-3082 as required for floor covering thickness installed. Shallow type box three-inch minimum depth with conduit entrances for 1/2-inch and 3/4-inch conduits, Hubbell B-2529, or approved. Deep type four-inch maximum depth with conduit entrances for 1/2-inch thru 1-1/2-inch Hubbell Cat. No. B2527, or approved.
  - B. Multi-gang box locations: Provide single gang boxes grouped as shown on Drawings. Separate as directed to allow for proper installation of carpet.
  - C. Covers for round single gang boxes brass as follows:
    1. At 120 volt duplex receptacle locations Hubbell Cat. #S-3725 with two plastic brass finish rings, Hubbell S-3072 (two required at each location).



- 2. At microphone, visual education, etc., flush floor boxes to have single opening 2-1/8 inch diameter Hubbell S-2925 with one Hubbell S-3086 brass finish cast aluminum split nozzle.
- D. Combination power and telephone pedestal floor outlets same as for non-carpeted areas above.
- E. Carpet flange: Hubbell S-3079 round Lexan.

#### 2.06 Recessed Floor Boxes

- A. Provide recessed floor box with full-access hinged lid. Box shall be welded steel approximately 10" x 12" x 4" deep.
- B. Accessories:
  - 1. Provide concrete pour pan for slab-on-grade applications. Floor box shall be supplied with leveling feet.
  - 2. Provide power, data and blank cover plates from floorbox manufacturer. Contractor shall provide blank coverplates to finish unused sections of floor box.
  - 3. Provide all data/low-voltage terminations.
- C. Floor box shall be provided with the minimum number of device outlets as indicated on the drawings.
- D. Hinged Lid: Contractor shall determine proper lid configuration for carpeted and non-carpeted floors. Verify solid lid color (non-carpeted areas) or carpet depth (carpeted areas) with Architect.

#### 2.07 Finish plates:

- A. At surface wiring, raised galvanized industrial type. National Association of Electrical Distributors 12000 Series.
- B. At all typical location: WHITE thermoplastic. Arrow-Hart or approved.
- C. Engraved plates: See Execution for requirements.
- D. Receptacles fed by emergency circuits shall have red devices with "EMERGENCY POWER" engraved in white letters on a red nylon plate with panel and circuit number designation engraved on plate.
- E. Damp location receptacle finish plates: Stainless steel, type 302 horizontal plate. Arrow-Hart 4501 or approved.
- F. Wet locations (exterior) receptacle finish plate: UL listed to be weatherproof while in use. Cover base to be constructed of heavy duty noryl and cover to be constructed of lexan. Thomas & Betts. Perfect Line Weatherproof cover or approved.
- G. Telephone and Data: Blank coverplate, finish to match receptacle.
- H. Plate Securing Screws: Metal with heads finished to match finish plate.

### PART 3 - EXECUTION

#### 3.01 Inspection

- A. Determine outlet boxes, raceways and conductors are properly installed and outlet boxes are cleaned of all foreign matter before installing devices and finish plates.
- B. Inspect each wiring device for defects.

#### 3.02 Installation

- A. Install wiring devices in accordance with NECA "Standard of Installation".
- B. Do not install devices or finish plates until final painting is complete.
- C. Switches:
  - 1. Install switches with the OFF position down.

2. Do not group or gang switches in outlet boxes unless they can be so arranged that voltage between adjacent switches does not exceed 300 volts, or installed in boxes equipped with permanently installed barriers between adjacent switches.
- D. Verify mounting location of photo controls to insure proper operation from outside lighting. In general, photo control mounting exposed to north.
- E. Receptacles:
1. Install receptacles with the ground pole on top.
  2. Install a separate green or bare wire between the receptacle strap grounding (green) screw and a screw into the outlet box. Self-grounding strap not approved as grounding means.
- F. Floor boxes:
1. Do not install interiors of floorboxes until they are no longer subject to corrosion, water, construction debris, etc. Floorboxes shall be clean and new condition upon acceptance by Owner. Contractor shall replace oxidized, corroded, or otherwise damaged interior components.
  2. Boxes set plumb and true and adjusted after installation to be flush with finish floor. At carpeted areas provide carpet flange and coordinate work with carpet installer.
  3. At locations requiring more than three gangs, make up installation of combinations of single and two gang floor boxes spaced as directed by Engineer.
  4. Deliver cover rings and split nozzles to Owner and at flush fittings leave outlets closed with threaded plugs.
  5. Verify location of all outlets prior to installation.
- G. Finish Plates:
1. Install devices and finish plates plumb with building lines.
  2. Use jumbo size plates for outlets installed on masonry walls.
  3. Do not install finish plates until final painting is complete.
- H. Wall Box Dimmers:
1. Install dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.
  2. Do not share the neutral conductor on load side of dimmers.
- I. Occupancy Sensors:
1. Manufacturer to design complete occupancy sensor system for all areas where occupancy sensors are called out on the drawings.
  2. It shall be the contractor's responsibility with the suppliers assistance to locate and aim all occupancy sensors in the correct location required for complete and proper volumetric coverage within the range of coverage of controlled areas.
  3. Rooms shall have ninety (90) to one hundred (100) percent coverage to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the room.
  4. The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only rooms that are to be provided with sensors.
  5. The contractor shall provide additional sensors if required to properly and completely cover the respective room.
  6. Proper judgment must be exercised in executing the work to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components.

7. Final location of ceiling mounted ultrasonic occupancy sensors shall be a minimum of 48 inches away from any HVAC diffuser.

### 3.03 Identification

1. Switches: Where 2 or more switches are ganged and where indicated, identify each switch with approved legend engraved on wall plate.
2. Receptacles: Identify the panelboards and circuit number from which served. For nylon faceplates, engrave panel and circuit number on face and highlighted in contrasting color. For stainless steel plates use machine printed, pressure sensitive, abrasion resistant label tape on face of plate and durable wire markers or tags within outlet box.

### 3.04 Testing

- A. Operate each wall switch with circuit energized and verify proper operation.
- B. Verify that each receptacle devices is energized.
- C. Test each receptacle for proper polarity.
- D. Test each drive for ground continuity.
- E. Test each ground fault circuit interrupter operation with both local and remote fault simulations according to manufacturers recommendations.

### 3.05 Cleaning

- A. Internally clean device, device outlet box and enclosure.
- B. Replace stained or improperly painted finish plates or devices.

END OF SECTION

BLANK PAGE

## **SECTION 26 5100 LIGHTING FIXTURES**

### **PART 1 - GENERAL**

- 1.01 Description
- A. Provide lighting fixtures of type and wattages indicated on Drawings by letter and number shown adjacent to lighting outlet symbol. A fixture typical for location is to be installed at every lighting outlet unless otherwise indicated.
  - B. Provide fixtures complete with lamps, ballasts, reflectors, diffusers, lenses, shielding, hangers, and accessories.
  - C. Related work in other sections includes:
    - 1. Providing concrete bases for poles, Division 03.
    - 2. Providing conductors and connectors, Section 26 0519, Conductors and Cables.
    - 3. Providing raceways and fittings, Section 26 0533, Raceways and Boxes.
    - 4. Providing fire rated enclosures at light fixtures.
- 1.02 Quality Assurance
- A. UL listed or CSA certified for application.
  - B. NEMA SSL 1: Electronic Drivers for LED Devices, Arrays, or Systems.
- 1.03 Coordination
- A. Confirm compatibility between final luminaire and lighting control selections.
  - B. Confirm compatibility and interface of other materials with luminaire and ceiling system. Report discrepancies to the Engineer/Architect and defer ordering until clarified.
  - C. Supply plaster frames, trim rings and backboxes to other trades.
  - D. Coordinate with Division 23 to avoid conflicts between luminaires, supports, fittings, and mechanical equipment.
- 1.04 Submittals
- A. Submit a complete list of fixtures, lamps and ballasts with catalog numbers, manufacturer's drawings, photographs or catalog sheets for approval prior to ordering fixtures. Submittal to be in accordance with Division 01 or 26 0500, Shop Drawings and Materials Lists (when included).
  - B. Submit operation and maintenance data in accordance with Division 01 or 26 0500, Electrical Equipment Maintenance Manuals (when included).
- 1.05 Product Delivery, Storage And Handling
- A. Deliver fixture in manufacturer's original unopened packages with labels legible and intact.
  - B. Deliver with UL label and bearing manufacturer's name.
  - C. Deliver poles wrapped and protected from damage.
  - D. Store and handle so as not to subject materials to corrosion or mechanical damage and in manner to prevent damage from environment and construction operation.

### **PART 2 - - PRODUCTS**

- 2.01 General:
- A. Fixture types: See light fixture schedule on drawings for fixture types and acceptable manufacturers.
  - B. No sockets having fiber insulating liners will be permitted.

- C. Polystyrene lenses and lenses less than 0.125 inches nominal thickness shall not be permitted unless noted otherwise.
- D. Provide fixtures with ACL, damp or wet label if required for the applications indicated.
- E. All recessed fixtures shall be free of light leaks.

2.02 Approved Manufacturers:

- A. See Light Fixture Schedule on drawings for approved manufacturers and specifically approved products (models).
- B. Listing of a manufacturer on the Light Fixture Schedule (or other Contract Documents) does not constitute the approval of a specific fixture model not otherwise specifically identified on the Light Fixture Schedule.
- C. The supplier/contractor is responsible to provide approved light fixtures that meet the requirements as specified herein and on the drawings (Light Fixture Schedule, general and keyed notes, etc.).
- D. Other manufacturer's products submitted for approval must meet the aesthetic appearance and quality standards of the specific model listed as the basis of design. The contractor shall, at the discretion of the Engineer and/or Architect and at no cost to the Owner, replace any product deemed inferior to the specifically specified light fixture model.

2.03 Recessed Luminaires

- A. Supply recessed luminaire complete with trim type required for ceiling system installed. Before ordering, confirm ceiling construction details and architectural finish for each area.
- B. Confirm recessed luminaires are suitable for installation where encountering sloped ceilings.

2.04 Pendants & Cable Hangers

- A. Swivel sockets permitting normal fixture motion and self-adjustment. Adjustable to provide fixture height alignment.
- B. One-piece, white finish, with matching canopies.
- C. Fixtures shall be factory counter-weighted and balanced to provide level hanging. Weights shall not be visible.
- D. Cable hangers shall be adjustable for a minimum of 24 inches.
- E. Provide any sloped ceiling adaptors as required for pendant installation.

2.05 LED (Light Emitting Diode):

- A. LED manufacturer will include, but not be limited to, light source, luminaire, power supply and control interface with added components as needed for complete and functioning system.
- B. Warranty: LED systems and complete luminaires must have a manufacturer's warranty of 3 year from date of substantial completion.
- C. Compliance
  - 1. LED light fixtures shall be in accordance with IES, NFPA, UL as shown on the Drawings and as specified.
  - 2. LED light fixtures shall be Reduction of Hazardous Substances (RoHS) compliant.
  - 3. Comply with ANSI chromaticity standard for classifications of color temperature. See luminaire schedule for specified LED lamp color and color temperature. UL or ETL listed and labeled.
  - 4. Luminaire testing per IESNA LM-79 and LM-80 procedures.
- D. LED drivers shall include the following features unless otherwise indicated:
  - a. Minimum Efficiency: 85% at full load.

- b. Minimum Operating Ambient Temperature: -20°C (-4°F).
  - c. Input Voltage: 120-277V (±10%) at 60 Hz.
  - d. Integral short circuit, open circuit, and overload protection.
  - e. Power Factor: ≥ 0.95.
  - f. Total Harmonic Distortion: ≤ 20%.
  - g. 4-wire (0-10VDC voltage controlled) dimming driver. Capable of dimming from 100% to 5% light output, unless otherwise noted, and step to 0%. Driver shall respond similarly when raising from 0% to 100%.
  - h. Driver shall be free from objectionable flicker as measured by flicker index (ANSI/IES RP-16-10).
- E. Lamp life
- 1. White LEDs: 50,000 plus hours with lamp failure occurring when LED produces 70 percent of initial rated lumens (IES L70).
  - 2. Color LEDs: 30,000 plus hours with lamp failure occurring when LED produces 50 percent of its initial rated lumens.
- F. Provide shop drawings, with LED systems based on lumen output at 70 percent lumen depreciation for white LEDs and 50 percent lumen depreciation for color LEDs. Initial lumens for all colors of LEDs must be listed individually.
- G. LED Downlights: Housing, LED driver, and LED module shall be products of the same manufacturer.
- H. LED Troffers:
- 1. LED drivers, modules, and reflector shall be accessible, serviceable, and replaceable from below the ceiling.
  - 2. Housing, LED driver, and LED module shall be products of the same manufacturer.
- I. Provide extra replacement LED driver for each fixture type in project. Quantity: 10%. Where a fraction occurs, round up to next larger integer.
- J. LED light source manufacturers: Nichia, Cree, Osram/Sylvania, GE Lumination or approved.
- 2.06 Fixture lengths: Furnish fixtures of lengths shown on Drawings. At continuous runs furnish joiner plates, end plates and all required fittings.
- 2.07 Fixture mounting:
- A. General: Provide all blocking and supports as required. Fixtures may be supported from ceiling system unless specifically indicated otherwise.
  - B. Surface mounted fixtures: Provide UL approved fixtures at low-density cellulose fiber ceilings. 1-1/2 inch spacers not permitted unless specified fixture is unavailable with low-density rating.
  - C. Recessed fixture: Provide fixtures with plaster frames, ceiling flanges and hangers as required for specific ceiling conditions. Verify ceiling types prior to ordering fixtures. Provide thermal protection for all High Intensity Discharge and Incandescent fixtures mounted in a recessed application (non lay-in ceiling).
  - D. Stem suspended fixtures: Provide stems with aligned canopies. Stems of length specified or required for proper mounting of fixture.
  - E. Positively attach all lighting fixtures to suspended ceiling systems. Attachment device to have capacity of 100 percent of lighting fixture weight acting in any direction.
  - F. Lighting fixtures weighing more than 20 pounds but less than 56 pounds shall have in addition to the requirements outlined above, two No. 12 gauge hangers connected from fixture housing to structure above. These wires may be slack. Fixtures weighing more than 56 pounds are to be suspended from the structure and not from suspended ceilings.

## **PART 3 - EXECUTION**

### **3.01 Inspection**

- A. Verify location, ceiling types and mounting requirements for each fixture prior to ordering fixtures.
- B. Verify voltage at each fixture outlet prior to installation.
- C. Examine fixtures for damage or broken parts and replace prior to installation.

### **3.02 Installation**

- A. See architectural reflected ceiling plan for exact location of fixtures and ceiling types.
- B. Coordinate installation of fixtures with other subcontractors, and verify methods of hanging and supporting required.
- C. All fixtures to be illuminated at time of acceptance.
- D. Fixtures located in mechanical and store rooms to be coordinated with ductwork, piping and structural members. Adjust stems as required for proper illumination of the area.
- E. All recessed fixtures to be flex connected to branch circuit outlet box unless fixture is provided with code approved junction box. Connection to conform to Article 410-67 of NEC.
- F. Fixtures recessed into fire rated ceilings shall be provided with an approved fire-rated enclosure or have an enclosure built around them that will not violate the fire rating of the ceiling.
- G. All light outlets shall be supplied with a fixture. Outlet symbols on the drawings without a type designation shall have a fixture the same as those used in similar or like locations.
- H. Fixtures of a given description may be used in more than one type of ceiling. The fixture list and electrical drawings do not indicate what type of ceiling a recessed fixture is intended for. Consult the Architectural Reflected Ceiling plan to obtain this information. The contractor shall confirm that the specified fixtures are compatible with the ceiling system and is responsible to provide all mounting apparatus required for proper installation.
- I. Where fixtures are mounted under cabinets, in soffits, coves, or other physically restricting spaces, the contractor shall verify that the fixtures will fit the space prior to ordering.
- J. Under cabinet and similar fixtures are to be hard wired. Flexible cords similar to SO cord are not acceptable.

### **3.03 Adjustment And Cleaning**

- A. Fixture supports shall provide proper alignment and leveling of fixtures.
- B. Aim adjustable fixtures as directed by Architect or Engineer. Exterior fixtures should be adjusted for proper illumination of areas.
- C. Clean all foreign matter from interior and exterior of fixtures and from exterior of poles, touch-up scratched or marred surfaces to match original finish.

### **3.04 Testing**

- A. Operate the complete exterior lighting system for seven (7) consecutive days. When the lighting performance is satisfactory to the Engineer, the system will be accepted.

END OF SECTION



**SECTION 27 2500  
TELEPHONE AND COMPUTER DATA**

**PART 1 - GENERAL**

**1.01 Description**

- A. Provide complete telephone system infrastructure for installation of utility and owner furnished equipment. Provide Telephone Terminal Board and all required grounding.
- B. Provide service entrance conduits for underground telephone, cable TV, and/or data service from serving utility pole to telephone terminal location in building. Field coordinate with utility service providers.
- C. Provide complete data/telephone distribution system including CAT 6 conductors, devices with cover plates, boxes, terminal cabinets, etc., as indicated on Drawings.

**1.02 Network Overview**

- A. The network of voice/data cabling is designed and will be constructed in a star, with the hub located in the Utility Room.
- B. A horizontal CAT 6 cabling system connects the hub to the individual telephone/data jacks throughout the building.
- C. All voice and data cabling, jacks, and patch panels will be CAT 6. All cables are to terminate on contractor-furnished patch panels in the data rack. The layout of the data rack is to be verified with the owner prior to work.

**1.03 Quality Assurance**

- A. Conform to requirements of serving utility.
- B. UL Listed.
- C. National Electrical Code with state and local amendments.
- D. ANSI/TIA/EIA-568-A – Commercial Building Telecommunications Wiring Standard
- E. EIA/TIA 569 – Commercial Building Standard for Telecommunications Pathways and Spaces.
- F. EIA/TIA-607 – Commercial Building Grounding and Bonding Requirements for Telecommunications.
- G. IEEE 802.3y – Physical layer specifications for 100Mb/s.

**1.04 Submittals**

- A. Submit equipment data sheets and shop drawings in accordance with 26 0500, Shop Drawings and Materials Lists, Basic Electrical Materials and Methods.
- B. Submit operation and maintenance data in accordance with 26 0500, Electrical Equipment Maintenance Manuals, Basic Electrical Materials and Methods.

**PART 2 - PRODUCTS**

**2.01 Rough-in Materials**

- A. Outlet Boxes: 4" square, 2-1/8" deep minimum with 1-gang device ring.
- B. Conduits: 1" minimum size with larger sizes as indicated on the Drawings.
- C. Pull Boxes: Sheet metal, primed and painted, screw cover.
- D. Telephone terminal backboards shall be 4'x8'x3/4" plywood with a grade of "AB" or higher. Plywood shall be fire-rated or painted with fire retardant paint as requested by utility. Mount with best side out. Backboards shall be smooth finished, sanded surface without significant blemishes. If the plywood is to be painted, prime and paint with two coats of white fire retardant paint, Benjamin Moore IronClad Retardo, or approved alternate.

## 2.02 Conductors

- A. Unshielded twisted pair cable CAT 6, 4-pair, 24 gauge copper unshielded twisted pair, PVC coated cable listed as complying with UL Type CM, C(UL) Type CM, ANSI/TIA/EIA-568-B.2 CAT 6. Belden Data Twist 6+.
- B. Paired, 25 pairs, 24 AWG, solid BC – bare copper conductors, S-R PVC – Semi-rigid polyvinyl chloride insulation, unshielded, PVC jacket, jacket sequentially marked at 2 foot intervals.

## 2.03 Jacks

- A. Panduit mini-com mini jack CAT6 with universal 568A or 568B pin-out. Verify color with Architect prior to order.

## 2.04 Face Plates

- A. Panduit mini-com executive series vertical 2-port faceplates. Verify color with Architect prior to order. A blank of the same color is required for any ports not utilized during the installation of the network.

## 2.05 Patch Panels

- A. Panduit DP6 48 port with universal 568A or 568B pin out for data.

## 2.06 Wire Managers

- A. Panduit Slotted Duct Horizontal Management System, 2-sided cable manager utilizing 2-rack spaces. The front manager shall measure 3"x3" and the rear manager shall measure 2"x4". One above and below each patch panel that is installed.

## 2.07 Equipment Racks

- A. Provided by Owner. The ground for the rack shall be installed by contractor.

## PART 3 - EXECUTION

### 3.01 Inspection

- A. Verify location of all telephone and data outlets with architectural Drawings prior to roughing-in. Where outlets occur at built-in counters, desks, and bookshelves coordinate with other trades.
- B. Examine area to receive terminals and equipment to assure adequate clearance.

### 3.02 General Installation

- A. Verify installation requirement with serving utility. Stub conduit up nominally six inch above floor or below ceiling at terminal facilities provided by Telephone Company and lock into metal template with locknuts and insulating bushings.
- B. Underground Service: Provide conduit down pole, elbow at bottom of pole and conduit from pole to terminal location inside building. Conduit to continue up exterior of building and terminate inside building at designated location. Other exterior raceways as indicated on Drawings.
- C. Conduit bends to be large radius field bends or factory ells. At wall outlets at frame or metal studs telephone connector place telephone connector inside wall cavity and not in surface mounted box located over telephone outlet. Thru wall box and conduits at these locations to be properly supported.
- D. Provide pull-in line in all empty raceways
- E. Anchor plywood terminal board to the building structure. Use of toggle bolts to attach to the sheetrock is not an acceptable means of support.
- F. Provide ¾" raceway and #6 solid copper wire to main electrical ground bus for Telco ground. The demarcation point must be within 20 feet of the main electrical ground. Verify exact requirements with Utility.
- G. Provide conduit from outlet box into accessible ceiling space. Conduit to include bushings and pull-in line.

### 3.03 Cabling Installation

- A. Strict adherence shall be made to Manufacturer's installation instructions and requirements. Where conflicts arise between the requirements of this specification and the manufacturer's installation instructions, the Architect shall be consulted for resolution.
- B. All wiring systems shall be installed according to related standards as listed within TIA/EIA-569. All installed cables shall be kept free from nicks, abrasions, and cuts during storage and installation. Defective wiring will be replaced at the Contractor's expense in a manner that will not delay the progress of the project.
- C. Installation shall provide minimal signal impairment by closely following manufacturer's installation guidelines, and by preserving wire twists as closely as possible to the point of termination.
- D. Installation shall be neat, well organized, and of professional quality, with wire management and termination practices in accordance with manufacturer's guidelines. Cabling will be supported in the ceiling according to industry standard and manufacturer recommendations to minimize cross talk, EMI, and damage. Cabling is to be dressed and secured with Velcro Cable Ties from the point it enters the data room space to the point it enters the cable managers or is terminated.
- E. All cables will be home run. Splicing of cables will not be accepted. All CAT 6 cables will be run to the data rack and terminated on the patch panel.
- F. Leave 18" of coiled cable at each outlet, and 12" loosely coiled cable in the Horizontal Cable Manager in the data room in a way that does not kink the cable. Cable is to be installed in the data rack so the rack is not impaired, and can open to the fullest extent without cable interference.
- G. Provide CAT 3, 25 pair cable from the TTB (demarc) to the data rack. Verify termination type with owner prior to installation. Provide a minimum of 10 feet of slack at each end of the cable (verify with owner).

### 3.04 Labeling

- A. All cables shall be identified, by the Contractor, at both ends of the wiring run. Identification shall be made by legible, indelible marking on cable tags. Cable tags shall be affixed to the ends of each cable comprising the run. All tags are to be made for the purpose of labeling cables. The labels are to be done with a mechanical printing device such as a P-Touch or similar label maker. Hand written tags or labels are not acceptable.
- B. Each cable shall be labeled at each end in the format given by the owner. The number shall be pre-printed on a cable tag, with the tag secured to the cable sheath no more than 4-inches from its termination. Verify labeling scheme to be used with the Owner or Architect

### 3.05 Testing

- A. The Contractor shall perform all of the following tests, and provide all tools and instruments used to test the installed system. Test instruments used by the Contractor shall be suitable for the intended procedure and of industry-recognized standards.
- B. The Contractor shall use a Fluke or equal twisted pair cable tester for the testing of all CAT 6 copper cabling installed in this contract. Provide test data in electronic format that does not require proprietary software to view and hard copy. The test results are to be placed into a 3-ring binder utilizing plastic sleeves with the test results in numeric or alphabetic order depending on labeling scheme used.
  - 1. All cables shall be tested bi-directional for the following parameters: Wire map/continuity, length, attenuation, NEXT (near end cross talk), ELFEXT (equal level far end cross talk), delay and delay skew, return loss, and PSELFEXT (power sum equal level far end cross talk).
  - 2. All test results are to meet the current industry standard for length and dB loss.

END OF SECTION

BLANK PAGE

**SECTION 28 3100  
FIRE ALARM AND DETECTION - ADDRESSABLE**

**PART 1 - GENERAL**

1.01 Description

- A. The contractor shall furnish and install a complete 24 VDC, electrically supervised, analog addressable fire alarm system as specified herein and indicated on the drawings. The system shall include but not be limited to all control panels, power supplies, initiating devices, audible and visual notification appliances, alarm devices, accessories, and any programming required to provide a complete operating fire alarm system.
- B. Design/Build:
1. The electrical contractor or subcontractor is responsible to design a complete system (including all raceways, boxes, conductors, cables, and equipment), which meets current codes.
  2. Additional requirement above and beyond code requirements: Some items specified herein and/or shown on the electrical drawings may be above and beyond code requirements. The contractor or subcontractor is responsible to include said items into their design and in doing so, shall meet the requirements of the associated portions of the Code (as indicated by NFPA 72 Appendix A.3.3.111).
- C. System Operation:
1. Alarm: Automatically indicate at the Fire Alarm Control Panel and any Remote Fire Alarm Annunciator Panel that a fire alarm has been initiated and the initiating device; Transmit an alarm signal to the remote central station indicating the system has been initiated and the initiating device; Close all fire and/or smoke doors and operate all alarm and auxiliary devices throughout the building; under the following conditions:
    - a. A manual break glass station is activated.
    - b. An automatic station is activated.
    - c. A mechanical heating and ventilating system air duct detector has been activated.
    - d. A flow switch of the sprinkler system is activated.
  2. Trouble: Automatically indicate at the fire alarm control panel and any Remote Fire Alarm Annunciator Panel that a trouble condition has been initiated and the initiating device; Transmit a trouble signal to the remote central station indicating the system has a trouble condition and the initiating device; under the following conditions:
    - a. A short or open occurs in the system.
    - b. The system goes to improper ground.
    - c. The power is shut off to the local alarm signals in the building.
    - d. The tamper switch at an OS&Y valve has been activated.
    - e. An air compressor low-pressure switch has been activated.
  3. An alarm or trouble shall be silenced by a code or Firefighter key at the main or remote annunciators. When silenced, this shall not prevent the resounding of subsequent events if another event should occur (subsequent alarm feature). When alarms are silenced the silenced LED on the control panel, and on any remote annunciators shall remain lit, until the alarmed device is returned to normal.
  4. Provide 24 hour, 24 volt D.C. standby battery power source for system in case of power failure.
- 1.02 Related work in other sections includes:
- A. Providing identification, Section 26 0500, Basic Electrical Materials and Methods.
  - B. Providing conductors, Section 26 0519, Conductors and Cables.

- C. Providing raceways, Section 26 05330, Raceways and Boxes.
  - D. Providing flow switches, OS&Y valve monitoring switches (OS&Y tamper switches), air compressor low pressure switches, mechanical system ionization detectors (air duct detectors), Division 23.
  - E. Providing magnetic door holders, combination door closers and holders with integral smoke detector device, Division 08, Finish Hardware.
- 1.03 Related work by Owner: Providing telephone lines as required for transmitting signal to remote central station and making arrangements with the remote central station to receive the alarm signals.
- 1.04 Quality Assurance
- A. The fire alarm equipment and installation shall comply with the current provisions of the following standards and shall be listed for it's intended purpose and be compatibility listed to insure integrity of the complete system.
    - 1. UL Listed: All equipment shall be approved by Underwriters Laboratories, Inc. for its intended purpose.
    - 2. NFPA 72 – National Fire Alarm Code.
    - 3. NEC Article 760 - Fire Alarm Systems.
    - 4. Oregon Structural Specialty Code.
    - 5. Americans with Disabilities Act (ADA): All visual Notification appliances and manual pull stations shall comply with the requirements of the Americans with Disabilities Act.
    - 6. Local and State Building Codes and Authorities Having Jurisdiction.
- 1.05 Submittals
- A. Submit shop drawings, wiring diagrams and product data sheets in accordance with Division 01 or 26 0500, Shop Drawings & Material Lists, Basic Electrical Materials and Methods. As a minimum, submittal shall include:
    - 1. Product Cutsheets
    - 2. Battery Calculations
    - 3. Voltage Drop Calculations
    - 4. Input/Output matrix
    - 5. Drafted plans showing layout of devices as designed by Manufacturer's rep with additionally required devices as shown on Fire Alarm plans
    - 6. Standard mounting height details
    - 7. Special ceiling height and configuration details.
  - B. Submit plans and specifications to the local fire marshal. Obtain his written acceptance of the system prior to beginning work and ordering equipment.
  - C. Submit operation and maintenance data in accordance with Division 01 or 26 0500, Electrical Equipment Maintenance Manuals, Basic Electrical Materials and Methods. Minimum items to include:
    - 1. Installation and Programming manuals for the installed Life Safety System.
    - 2. Point by point diagrams of the entire Life Safety System as installed. This shall include all connected Smoke Detectors and addressable field modules.
    - 3. All drawings must reflect device address as verified in the presence of the engineer and/or end user.
  - D. Have manufacturer submit on completion of system verification a point-by-point checklist indicating the date and time of each item inspected and issue a Certificate confirming that the inspection has been completed and the system is installed and functioning in accordance with the specifications.

- 1.06 Contractor Qualifications
- A. Manufacturer's Approval: The Contractor shall be an authorized representative of the fire alarm manufacturer to install and service the manufacturer's equipment.
  - B. State Fire Marshal Licensing: The Contractor shall be licensed by the State Fire Marshal to install fire alarm systems. The Contractor's installation superintendent shall be licensed by the State Fire Marshal to supervise the installation of the fire alarm system.
- 1.07 Product Delivery, Storage & Handling
- A. Deliver equipment with UL Label and bearing manufacturer's name.
  - B. Store and handle fire alarm equipment so as not to subject it to corrosion or mechanical damage and in a manner to prevent damage from environment and construction operation.
- 1.08 Warranty: Warranty all materials, installation and workmanship for a one (1) year period (365 days) from the date of final acceptance by the awarding authority, unless otherwise specified. Equipment or components showing inherent defects of a mechanical or electrical nature shall be replaced promptly at no expense to Owner providing it does not show abuse. A copy of the manufacturer warranty shall be provided with the close out documentation.

## **PART 2 - PRODUCTS**

- 2.01 Control Panel:
- A. Flush mounted steel cabinet finished in red baked enamel with lockable, hinged door and two master keys.
  - B. Provide auxiliary relays, alarm confirmation, input modules, extender modules, releasing device modules, zone modules required to result in operation described.
  - C. The main control must have a built in annunciator with a minimum 40-character LCD display and feature LED's for General alarm, Supervisory, System trouble, System silence and Power. When in the normal condition the LCD shall display time and date based on a clock that is capable of automatic daylight savings time adjustments. All controls and programming keys are silicone mechanical type with tactile and audible feedback. The annunciator must be able to silence and reset alarms through the use of a keypad-entered code, or by using a firefighter key. Two levels of password protection shall be provided in addition to a key-lock cabinet. One level is used for status level changes such as zone disable. A second (higher-level) is used for actual changes of program information.
  - D. The FACP must compensate for drift or the accumulation of contaminants that affect detector sensitivity. Provide panel with maintenance alert feature (differentiated from trouble condition) and detector sensitivity selection
  - E. The FACP shall have an auto-programming feature that can automatically enroll all properly connected accessories into a functional system within 60 seconds of powering up the panel.
  - F. Alarm/Trouble silencing. Alarm/trouble silence switch shall silence audible device and cause flashing common alarm light to revert to a steady condition. Subsequent alarms shall cause lamps to resume flashing.
  - G. Provide an audible buzzer to sound upon trouble.
  - H. A "Fire Drill" mode shall allow the manual testing of the fire alarm system notification circuits. The "Fire Drill" shall be capable of being controlled at the main annunciator, remote annunciators and via a remote contact input.
  - I. Provide digital communicator for transmitting alarm and trouble condition to the remote central station and provide 3/4" conduit with pull-in line from panel/digital communicator to the telephone terminations.
  - J. The control panel shall receive its primary operating power from a 120-volt AC, single-phase, 60-hertz supply. The entire system shall operate on 24 volts D.C.

- K. Batteries and Charger: Provide an automatic variable battery charger, which in the event of an AC power failure automatically transfers the system to battery power. Charger operation and battery condition shall be supervised. The battery charging circuit shall be capable of providing twenty-four (24) hours of battery standby with five (5) minutes of alarm signaling at the end of this twenty-four (24) hour period (as required per NFPA 72 remote station signaling requirements) using rechargeable batteries with automatic charger to maintain batteries in a fully charged condition. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks refilling, spills and leakage shall not be required.
  - L. Program system reset switch and pilot light.
  - M. Miscellaneous items required for complete system.
- 2.02 Remote Annunciator Panel: LCD Remote annunciators shall have the same control and display layout so that they match identically the built in annunciator. The reset and silence inputs must use the same firefighters key as the main panel. Remote annunciators shall be capable of operating at a distance of 6000 feet from the main control panel on unshielded non-twisted cable.
- A. Flush mounted with stainless steel trim and hinged locked door. Back box provided with terminal strips for each circuit factory wired to annunciator lights on door.
  - B. For outside installations or noted as weatherproof on the drawings, same as specified above except with weatherproof hinged stainless steel trim and hinged locked door with high impact polycarbonate clear window and vandalproof stainless steel hardware.
- 2.03 Alarm Initiation Devices:
- A. Manual Fire Alarm Stations: Semi-flush mounted non-coded, non-break glass, double action type physically indicating operation until reset. Provide a locking device that when opened for test or fire drill purposes will activate the system. Provide all manual stations with keys, master keyed with all other equipment specified herein. Provide contact rating and arrangement compatible with the system operation characteristics. Provide with addressable modules as required.
  - B. Heat Detectors: Automatic heat detectors shall have a combination rate of rise and fixed temperature rated at 135 degrees Fahrenheit for areas where ambient temperatures do not exceed 100 degrees, and 200 degrees for areas where the temperature does not exceed 150 degrees (Mechanical Rooms). The rate of rise element shall consist of an air chamber, a flexible metal diaphragm, and a factory calibrated, moisture-proof, trouble free vent, and shall operate when the rate of temperature rise exceeds 15 degrees F per minute.
  - C. Smoke Detectors:
    1. Automatic compliance with NFPA 72 standards for detector sensitivity testing.
    2. Drift compensation to assure detector is operating correctly and maintenance alert when a detector nears the trouble condition.
    3. Trouble alert when a detector is out of tolerance.
    4. Provide addressable detectors, semi-flush ceiling mounted with twist-lock plug-in head.
    5. The Smoke detector shall have a flashing status LED for visual supervision. When the detector is actuated, the flashing LED will latch on steady at full brilliance.
    6. The sensitivity of the detector shall be capable of being measured by the control panel without the need for external test apparatus.
    7. The detector shall be a double EE-prom technology and be programmed using the internal programming loop located on the FACP. On command from the control panel, send data to the panel representing the analog level of products of combustion.
    8. Provide detectors installed in elevator lobbies and machine rooms with auxiliary contacts for elevator control.



9. Ionization Detectors: Detectors shall use the dual-chamber ionization principal to measure products of combustion.
  10. Photoelectric Smoke Detectors: Operating on a light scatter principle and set to detect smoke at a nominal 1.5 percent light obscuration per foot.
- D. Sprinkler system flow switches, OS&Y valve monitoring switches, air compressor low-pressure switches. Provided by others.

2.04 Alarm Indicating Devices:

- A. Each indicating appliance circuit shall be electrically supervised for opens, grounds and short circuit faults, on the circuit wiring. The notification appliance (combination audible/visible units only) shall produce a peak sound output of 90dba or greater. The visible signaling appliance shall maintain a minimum flash rate of 1Hz or greater regardless of power input voltage. The appliance shall also be capable of meeting the candela requirements of each space as per NFPA and ADA
- B. Combination audio/visual strobe and horns with white cover and red "FIRE" lettering. Semi-flush mounted in walls, flush mounted in ceilings as shown on drawings.
- C. Combination strobe and speakers with white cover and red "FIRE" lettering. Semi-flush mounted in walls, flush mounted in ceilings as shown on drawings.
- D. Combination strobe and bells with white cover and red "FIRE" lettering semi-flush mounted in walls.
- E. Bells six inches in diameter, red.

2.05 Auxiliary Relays: Zoned auxiliary relay contacts provided for proper interface with the HVAC, elevator and door controls as required per the drawings and specifications.

2.06 Magnetic Door Holders: Provided under Section 08710, Finish Hardware.

2.07 Isolator Module

- A. Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC loop. The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC Loop. At least one isolator module shall be provided for each floor or protected zone of the building.
- B. The isolator module shall mount in a standard 4-inch deep electrical box or in a surface mounted back box. It shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

2.08 Acceptable Manufacturers: Fire Control Instruments, Honeywell, Notifier, Siemens, Silent Knight.

**PART 3 - EXECUTION**

3.01 Inspection

- A. Verify all conditions on site and include in bid all materials and labor as required for the complete system.

3.02 Installation

- A. Contract Drawings indicate locations of fire alarm devices and annunciator panels. Provide wiring to connect all devices and annunciator panels to fire alarm control panel. Where subject to damage or required by code, provide wiring in conduit.
- B. Follow installation procedures and wiring recommendations of equipment manufacturer in accordance with NFPA 72, National Electrical Code and applicable state and local requirements.
- C. Wiring requirements, in general are as follows:
  1. The Fire Alarm Control Panel shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled as FIRE ALARM. Fire Alarm Control Panel Primary Power wiring shall be 12 AWG.

2. It shall be the installer's responsibility to coordinate with the supplier, regarding the correct wiring procedures before installing any conduits or conductors.
  3. All wire used on the fire alarm system shall be U.L. Listed as fire alarm protection signaling circuit cable per National Electrical Code, Articles 760.
  4. Install any 120-volt AC wiring needed for control of doors, fans, elevators, etc. within a metallic raceway system separate from 24 volt D.C. initiating a signaling wiring.
  5. Provide minimum of 20 percent spare capacity in all circuits.
- D. Flow switches, OS&Y tamper switches, air compressor low-pressure switches for sprinkler system provided by the Mechanical Contractor and connected to the fire alarm system by the Electrical Contractor. Verify connection and roughing-in requirements.
  - E. Verify location of fire detection thermostats and ionization detectors being provided by mechanical subcontractor at mechanical air handling units. At fire detection thermostats, relays to be provided in mechanical local control panels at Mechanical Rooms for connection to annunciator indicator lights at Mechanical System Fire Annunciators. Verify location of detectors and connect as shown or required.
  - F. End of line resistors to be installed in Storage Rooms, Mechanical Rooms, or accessible furred areas.
  - G. Provide signal connections to elevator controller as required.
  - H. From fire alarm control panel provide one 3/4-inch conduit with pull-in line to nearest telephone terminal board or panel location for tie-in to central station.
  - I. Magnetic door holders provided by others and connected to the Fire Alarm System by the Electrical Contractor as required.
  - J. Combination door closers and holders with integral smoke detector provided by others and connected to the Fire Alarm System by the Electrical Contractor as required. Verify connections and coordinate with the General Contractor.
  - K. All elevator recall and shunt trip devices shall be home run to the Fire Control Panel.

### 3.03 Testing

- A. Prior to final test the fire department must be notified in accordance with local requirements.
- B. Before the installation shall be considered completed and acceptable by the awarding authority, a test of the system shall be performed as follows:
  1. The contractor's job foreman, a representative of the owner, and the fire department shall operate every building fire alarm device to ensure proper operation and correct annunciation at the control panel.
  2. At least one half of all tests shall be performed on battery standby power.
  3. Where application of heat would destroy any detector, it may be manually activated.
  4. The communication loops and the indicating appliance circuits shall be opened in at least two (2) locations per circuit to check for the presence of correct supervision circuitry.
- C. When the testing has been completed to the satisfaction of both the contractor's job foreman and owner, a notarized letter co-signed by each attesting to the satisfactory completion of said testing shall be forwarded to the owner and the fire department.
- D. The contractor shall leave the fire alarm system in proper working order.

### 3.04 Cleaning

- A. Clean all foreign matter from interior and exterior of fire alarm equipment and touch-up scratched or marred surfaces to match original finish.

END OF SECTION

**SECTION 31-2316  
EXCAVATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Excavating for building volume below grade, footings, and paving.
- B. Trenching for utilities outside the building to utility main connections.

**1.02 RELATED REQUIREMENTS**

- A. Section 31-2323 - Fill: Fill materials, backfilling, and compacting.

**1.03 PROJECT CONDITIONS**

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that survey bench mark and intended elevations for the work are as indicated.
- B. Survey existing adjacent structures and improvements and establish exact elevations at fixed points to act as benchmarks.
  - 1. Resurvey benchmarks during installation of excavation support and protection systems and notify Owner if any changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

**3.02 PREPARATION**

- A. Identify required lines, levels, contours, and datum locations.
- B. Locate, identify, and protect utilities that remain and protect from damage.
- C. Notify utility company to remove and relocate utilities.
- D. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- E. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

**3.03 EXCAVATING**

- A. Excavate to accommodate new structures and construction operations.

- B. Building Foundation Excavation:
  1. Excavate for the footings using a hoe equipped with a smooth-edged bucket. The excavation depth should accommodate a minimum of 6 inches of compacted Select Fill beneath the footings, or as required in Section 31-2323 FILL. The fill should extend at least 6 inches beyond the edges of all footings.
  2. Overexcavation will be required for footing excavations terminating in soft material, clay or unsuitable fill. The finished footing excavations should be observed by Architect to confirm the foundation soils and determine if any additional excavation is required.
- C. Pavement Area Excavation:
  1. Strip the pavement areas as required to remove existing vegetation and roots. Stripping depths are generally expected to be 12" or less. Dispose of all strippings outside of construction areas.
  2. Excavate as required to accommodate the minimum pavement section in areas requiring cuts. Overexcavate any soft subgrade and replace it with compacted Select Fill or Granular Site Fill. Compact the subgrade during dry weather as specified above.
- D. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- E. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
- F. Cut utility trenches wide enough to allow inspection of installed utilities.
- G. Hand trim excavations. Remove loose matter.
- H. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31-2323.
- I. Provide temporary means and methods, as required, to remove all water from excavations until directed by Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.
- J. Determine the prevailing groundwater level prior to excavation. If the proposed excavation extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect. If the proposed excavation extends more than 1 foot into the excavation, control groundwater intrusion with a comprehensive dewatering procedures.
- K. Remove excavated material that is unsuitable for re-use from site.
- L. Stockpile excavated material to be re-used in area designated on site.
- M. Remove excess excavated material from site.

### **3.04 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Provide for visual inspection of load-bearing excavated surfaces by Architect before placement of foundations.

### **3.05 PROTECTION**

- A. Divert surface flow from rains or water discharges from the excavation.

- B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
- C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.
- D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- E. Keep excavations free of standing water and completely free of water during concrete placement.

**END OF SECTION**

BLANK PAGE

**SECTION 31-2323  
FILL**

**PART 1        GENERAL**

**1.01        SECTION INCLUDES**

- A.    Filling, backfilling, and compacting for curbs, footing subgrades, building volume below grade, footings, slabs-on-grade, paving, site structures, utilities within the building, and sidewalks.
- B.    Topsoil filling in lawn and planter areas.
- C.    Backfilling and compacting for utility trenches shall be as specified in 31 2316.13 - Trenching.
- D.    Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

**1.02        RELATED REQUIREMENTS**

- A.    Section 31-2316 - Excavation: Removal and handling of soil to be re-used.
- B.    Section 32-1123 - Aggregate Base Course.
- C.    Section 32-1216 - Asphalt Paving.
- D.    Section 32-1313 - Concrete Paving.

**1.03        DEFINITIONS**

- A.    Finish Grade Elevations: Indicated on drawings.

**1.04        REFERENCE STANDARDS**

- A.    ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates 2014.
- B.    ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)) 2012.
- C.    ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method 2015, with Editorial Revision (2016).
- D.    ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN m/m<sup>3</sup>)) 2012.
- E.    ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method 2008.
- F.    ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2010.
- G.    ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth) 2010.

**1.05        SUBMITTALS**

- A. See Section 01 7000 - Shop Drawings, Product Data, Samples for submittal procedures.
- B. Soil Samples: 10 pounds sample of each type of fill; submit in air-tight containers to testing laboratory.
- C. Materials Sources: Submit name of imported materials source.
- D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.
- E. Compaction Density Test Reports.

## **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. When necessary, store materials on site in advance of need.
- B. When fill materials need to be stored on site, locate stockpiles where indicated.
  - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
  - 2. Prevent contamination.
  - 3. Protect stockpiles from erosion and deterioration of materials.

## **PART 2 PRODUCTS**

### **2.01 FILL MATERIALS**

- A. General Fill- Fill Type Class A: Use native or common material excavated from within limits of the project, free from vegetation and other detrimental material and containing no frozen ground. Maximum particle size shall be 3 inches. Engineer will make approval prior to placement. Compact to at least 95 percent of the maximum dry density, as determined by ASTM D 698.
- B. Granular Fill- Fill Type Class B: Use high quality, dense-grade, 1"-0 crushed rock, with less than 5 percent passing the U.S. Standard No. 200 sieve, compact to at least 98 percent of the maximum dry density, as determined by ASTM D698. Class B Granular Fill shall conform to Section 02630 of ODOT/APWA 2018 Oregon Standard Specifications for Construction.
- C. Building Foundation "Select" Fill: ¾-inch minus, clean (i.e., less than 5% passing the #200 U.S. Sieve), well-graded, crushed gravel or rock.
- D. Structural Fill: Use high quality, clean, dense-grade **1-1/2"-0** crushed rock conforming to Section 02630 of ODOT/APWA 2018 Oregon Standard Specifications for Construction. Compact to at least 95 percent of the maximum dry density, as determined by ASTM D1557.
- E. Sand- Fill Type Class C: Clean sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.
  - 1. Graded in accordance with ASTM C136/C136M; within the following limits:
    - a. No. 200 sieve: Less than 5 percent passing.
- F. Drainrock Fill - Fill Type Class D: Use granular permeable material; coarse, clean, free drain open graded 1 inch to 2 inch minus crushed rock containing no fines or round rock, less than 2 percent passing the #200 sieve.
- G. Fill Type Class E
  - 1. Use controlled low strength material (CLSM), a highly flowable lean concrete mix; a mixture of fly ash, Portland cement, fine aggregates and water which results in a harden, dense, non-settling fill and is excavatable. CLSM shall conform to Section 004420 of the ODOT/APWA 2018 Standard Specification for Construction.



- H. Topsoil- Fill Type Class F: Friable loam, imported borrow.
  - 1. Graded.
  - 2. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
  - 3. Soil analysis shall be performed to determine the following:
    - a. Soil PH
    - b. Soluble Salts
    - c. Excess Carbonate
    - d. Organic Matter
    - e. Nutrient readings for:
      - 1) Nitrogen, Phosphorus, Potassium
      - 2) Magnesium, Calcium, Sodium, Manganese, Sulfur, Zinc, Copper, Iron, Boron
    - f. Cation Exchange Capacity
    - g. Percent Based Saturation Sodium
    - h. Tests shall include analysis and interpretation of results. Soil testing methods shall be compliant with recognized agronomic testing standards for revegetation of disturbed sites.
    - i. Soil analysis shall determine if material meets ASTM D5268 requirements.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that survey bench marks and intended elevations for the Work are as indicated.
- B. Identify required lines, levels, contours, and datum locations.
- C. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.
- D. Verify structural ability of unsupported walls to support imposed loads by the fill.
- E. Verify areas to be filled are not compromised with surface or ground water.

#### **3.02 PREPARATION**

- A. Scarify, compact and proof roll subgrade surface to a depth of 6 inches to identify soft spots. Proof roll in the presence of the Architect. Do not place any fill in the building zone until proof rolling has been performed and observed by the Architect.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill Type B or Structural Fill.
- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- D. Until ready to fill, place 4 inches of compacted granular structural backfill over footing subgrades to protect the footing subgrades from foot traffic and the elements. Maintain excavations and prevent loose soil from falling into excavation.

#### **3.03 FILLING**

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Employ a placement method that does not disturb or damage other work.

- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 8 inches compacted depth.
- F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.
- G. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- H. Correct areas that are over-excavated.
  - 1. Load-bearing foundation surfaces: Use structural fill, flush to required elevation, compacted to 98 percent of maximum dry density.
  - 2. Other areas: Use Fill Type B, flush to required elevation, compacted to minimum 98 percent of maximum dry density.
- I. Reshape and re-compact fills subjected to vehicular traffic.
- J. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

### **3.04 FILL AT SPECIFIC LOCATIONS**

- A. Use **general granular Fill (Type B)** unless otherwise specified or indicated.
- B. Structural Fill at Building pads, under foundation:
  - 1. Use Fill Type Building Foundation Select Fill.
  - 2. Fill up to subgrade elevations as noted per Drawings.
  - 3. Maximum depth per lift: 8 inches, compacted.
  - 4. Minimum thickness: No minimum thickness required as the foundation is pile supported and structural fill not required for foundation support/base. However a gravel working pad is recommended for wet weather construction.
  - 5. Compact to minimum 95 percent of maximum dry density per ASTM D 698.
- C. At Planting Areas:
  - 1. Use Fill Type Class F, with blended 50% Compost Fill.
  - 2. Depth: 4 inches.
  - 3. Compact to 65 percent of maximum dry density.

### **3.05 TOLERANCES**

- A. Top Surface of General Filling: Plus or minus 1/2 inch from required elevations.
- B. Top Surface of Filling Under Paved Areas: Plus or minus 1/4 inch from required elevations.

### **3.06 FIELD QUALITY CONTROL**

- A. See Section 01 4500 - Quality Control, for general requirements for field inspection and testing.

- B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.
- C. When using the nuclear method of ASTM D6938, the gauge shall be field calibrated according to ASTM standards.
- D. For general fill, Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 ("standard Proctor").
- E. For "Structural Fill" evaluate results in relation to compaction curve determined in accordance with ASTM D1557 ("modified proctor").
- F. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- G. Frequency of Tests: For structural fill, tests shall be taken each day of production.

**3.07 CLEANING**

- A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

**END OF SECTION**

BLANK PAGE

**SECTION 32-1123  
AGGREGATE BASE COURSES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Aggregate base course.
- B. Aggregate final course, gravel drive areas, and other areas as noted.
- C. Paving aggregates.

**1.02 RELATED REQUIREMENTS**

- A. Revised Geotechnical Investigation and Seismic Site Hazard Report - EEI Report No. 19-038-1-R2, Prepared for Coos Bay School District by Earth Engineers, Inc., July 31, 2018, Revised February 3, 2021.
- B. Section 31-2323 - Fill: Compacted fill under base course.
- C. Section 32-1216 - Asphalt Paving: Finish and binder asphalt courses.
- D. Section 32-1313 - Concrete Paving: Finish concrete surface course.

**1.03 REFERENCE STANDARDS**

- A. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)) 2012.
- B. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method 2015, with Editorial Revision (2016).
- C. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN m/m<sup>3</sup>)) 2012.
- D. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method 2008.
- E. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth) 2010.

**1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Refer to Section 31-2323 Fill.
  - 1. Provide Class B Fill.

## **2.02 SOURCE QUALITY CONTROL**

- A. See Section 01-4000 - Quality Requirements, for general requirements for testing and analysis of aggregate materials.
- B. Provide materials of each type from same source throughout the Work.

## **2.03 SEPERATION GEOTEXTILE**

- A. Refer to Section 31-2323 for specification requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that survey bench marks and intended elevations for the work are as indicated.
- B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

### **3.02 PREPARATION**

- A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place aggregate on soft, muddy, or frozen surfaces.

### **3.03 INSTALLATION**

- A. Install Seperation Geotextile over the approved subgrade prior to placing Class B Fill.
- B. Under Bituminous Concrete Paving:
  - 1. Place Aggregate Type Building Foundation Select Fill to a total compacted thickness of 10 inches.
  - 2. Compact to 95 percent of maximum dry density.
- C. Under Portland Cement Concrete Paving:
  - 1. Place Aggregate Type Building Foundation Select Fill to a total compacted thickness of 10 inches.
  - 2. Compact to 95 percent of maximum dry density.
- D. Proof-roll the prepared base rock section prior to paving. Overexcavate and replace any areas of pumping base rock and/or subgrade with additional Select Fill.
- E. Place aggregate in maximum 4 inch layers and roller compact to specified density.
- F. Level and contour surfaces to elevations and gradients indicated.
- G. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.
- H. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
- I. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

### **3.04 TOLERANCES**

**3.05 FIELD QUALITY CONTROL**

- A. See Section 01-4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.
- C. If tests indicate work does not meet specified requirements, remove work, replace and retest.

**3.06 CLEANING**

- A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

**END OF SECTION**

BLANK PAGE



**SECTION 32-1216  
ASPHALT PAVING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Bituminous concrete paving.
- B. Surface sealer (pavement seal coating).

**1.02 RELATED REQUIREMENTS**

- A. Section 32-1123 - Aggregate Base Courses: Aggregate base course.

**1.03 REFERENCE STANDARDS**

- A. Hot Mixed Asphalt Concrete (HMAC) - Asphalt concrete is a hot mix of asphaltic cement; well graded, high quality aggregate; mineral filler and additives, as required; plant mixed into a uniformly coated mass, hot laid in on a prepared foundation, and compacted to a specified density.
- B. Oregon Standard Specifications (OSS), ODOT/APWA Standard Specifications; Current Edition.
- C. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction; 2009. ASTM D946-09a.

**1.04 QUALITY ASSURANCE**

- A. Perform Work in accordance with OSS.
- B. Mixing Plant: Conform to OSS.
- C. Obtain materials from same source throughout.
- D. Provide quality control per subsection 00745.16 of OSS. The intent of this project is for the Contractor to provide a certified ODOT mix design and compaction tests as provided in Section 00745.16. Other testing provided by Section 00745.16 may be required at the discretion of the Engineer.
- E. Field Conditions:
  - 1. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Asphalt Cement: PG64-22 performance grade asphalt cement conforming to ODOT requirements.
- B. HMAC shall be Level 2 HMAC, ½-inch Dense Graded Mix in accordance with OSS Section 00745.

- C. Tack Coat: Emulsified asphalt. Asphalt Tack Coat shall consist of CSS-1 or CSS-1h emulsified asphalt (EA) tack coat conforming to OSS 00730.
- D. Joint Sealant:
  - 1. Joint seal shall meet the test requirements of ASTM D 244.
  - 2. Joint seal material shall be CRS-1 or CRS-2 and shall meet the requirements of OSS; Section 02710 for Cationic Emulsified Rapid Setting Asphalt.

## **2.02 ASPHALT PAVING MIXES AND MIX DESIGN**

- A. Submit proposed mix design of each class of mix for review prior to beginning of work.

## **2.03 SEAL COAT**

- A. AI MS-19, sand type. Provide AR500 manufactured by ARMOR SEALCOAT, commercial based sealer appropriate for asphalt concrete.
- B. Substitutions: See Section 01-6000 - Product Requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.
- C. Verify finish grade for manholes, catch basins, and other items within pavement area.
- D. Sequencing and Scheduling. Notify Engineer and appropriate state, county or city department at least 48 hours prior to placement of aggregate base and pavement to permit inspection.
- E. Adhere to all applicable ODOT, OSHA, county and city regulations pertaining to road closure, traffic control, and other related safety precautions.

### **3.02 BASE COURSE**

- A. Section 32-1123 - Aggregate Base Courses.
- B. Ensure that aggregate base and other surfaces on which asphaltic concrete pavement is to be placed, are sound and compacted.

### **3.03 PREPARATION**

- A. To provide for the convenience and safety of the traveling public, pavement replacement shall be performed immediately following the completion of backfilling operations. In the event that pavement replacement cannot be performed as such, the Contractor shall maintain the trench backfill on a daily basis, as directed, until pavement replacement has been completed.
- B. Pavement Sawcutting. Utility trenches in existing pavement areas shall be sawcut immediately prior to repaving. Sawcuts shall be made a minimum of 12 inches outside the limits of the trench, or to the outer extents of pavement damaged as a result of the Contractor's operations, whichever is greater. See Trench Detail Drawing if applicable in Drawings. Depth of saw cut shall be sufficient to permit removal of material without damage to adjoining surfaces to remain.

- C. Manholes, inlets, and other structures shall have been completed, adjusted, cured and otherwise prepared, as applicable, and made clean and ready for asphalt placement. Cover top surfaces with paper or other material to prevent adherence of asphalt or tack coat.

### **3.04 TACK COAT**

- A. Apply tack coat in accordance with manufacturer's instructions.
- B. Ensure all surfaces are clean and dry. Remove all loose material.
- C. Contact surfaces of manholes, inlets, gutters, curbs, existing pavement edges and other surfaces shall be treated with a layer of asphalt tack coat to provide a good bond and seal.
- D. Coat surfaces of manhole and catch basin frames with oil to prevent bond with asphalt pavement. Do not tack coat these surfaces.
- E. Contact surfaces of existing pavement shall be treated with a layer of tack coat asphalt. Material, equipment, and construction shall conform to the requirements of Section 00730 of OSS. The tack coat shall be cured thoroughly prior to the application of the asphaltic overlay. Do not place on wet surfaces or during cold weather.
- F. Apply tack coat asphalt with a pressure distributor capable of uniformly applying the emulsified asphalt at even heat on variable surface widths up to 16-feet, at readily determined and controlled rates from 0.05 to 0.20 gallons per square yard, and with uniform pressure. Pressure distributor shall include a tachometer, pressure gages, accurate volume measuring devices and a thermometer for measuring temperature of tank contents. Pressure distributor shall be equipped with a positive power asphalt pump and full circulation spray bars adjustable both laterally and vertically. Set bar height for triple lap coverage.
- G. Tack coat asphalt shall be at a temperature between 140° F and 185° F as recommended by the manufacturer at the time of application.
- H. Do not place HMAC on the tack coat until the asphalt separates from the water, but before it loses its tackiness.
- I. Application Rate (gallons / yd<sup>2</sup>)
  - 1. Surface: Aggregate Base; 0.33; 0.67 if diluted 1:1 with water
  - 2. Surface: New HMAC; 0.05 to 0.07; 0.10 to 0.13 if diluted 1:1 with water
  - 3. Surface: Oxidized AC; 0.07 to 0.10; 0.13 to 0.20 if diluted 1:1 with water
  - 4. Surface: Milled AC; 0.10 to 0.13; 0.20+ if diluted 1:1 with water
- J. Joints between existing and new asphaltic concrete shall be filled with crack sealant asphalt.

### **3.05 PLACING ASPHALT PAVEMENT**

- A. Unless otherwise specified herein, HMAC shall be mixed, processed, hauled, laid, compacted and finished in accordance with OSS Section 00745.
- B. HMAC shall not be placed when the ambient temperature is below 40 degrees F unless otherwise approved by Engineer. When, in the judgment of the Engineer, the weather is such that satisfactory results cannot be achieved asphalt concrete paving operations shall be suspended.
- C. Care shall be taken at all times to prevent segregation in the mixture.
- D. HMAC at the time of placement shall have a temperature of at least 250 degrees F.
- E. Place asphalt within 24 hours of applying primer or tack coat.

- F. Deposit HMAC from haul vehicles so segregation is prevented. HMAC shall not be windrowed.
- G. Placement
  - 1. HMAC should be placed using a self-contained, self-propelled paver supported on tracks or wheels that do not contact the mix being placed.
  - 2. When leveling irregular surfaces and raising low areas, do not exceed 2-inches actual compacted thickness on any one lift.
  - 3. Place the mix in the number of lifts and courses, and to the compacted thickness for each lift and course as shown on the Plans. Limit the minimum lift thickness to twice the maximum aggregate size in the mix.
- H. Pavement shall be placed, shaped, compacted and finished to the grades and cross sections shown on the Plans or established. Taper new overlays at limits to match existing asphalt pavement.
- I. HMAC shall be compacted using self-propelled steel wheeled static rollers, vibratory rollers, or pneumatic tired rollers capable of achieving the minimum compaction specified. If vibratory rollers are used, they should be specifically designed for compaction of HMAC, have adjustable amplitude and frequency, and be capable of at least 2000 vibrations per minute. Finish rolling should be performed by a static roller or a vibratory roller in the static mode.
- J. Place two 2-inch compacted thickness minimum or as shown in the Drawings. Asphalt concrete pavement in excess of 2-inches thick shall be constructed in multiple lifts of approximately equal thickness. The maximum compacted thickness of any individual lift shall not exceed 2- inches.
- K. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
- L. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.
- M. Asphalt concrete pavement shall be compacted to a minimum of 92% relative compaction with the theoretical maximum density determined by AASHTO T-209. Testing shall be performed at random locations using a nuclear gauge operated in the back-scatter mode. At least one density test shall be performed every 1000 lineal feet on each spread or a minimum of one test each day of production.
- N. Test the top surfaces with a 12-foot long straight edge in conformance with Section 00745.70 of OSS. The finish grade shall have a smooth uniform surface for storm drainage with no low spots that would collect water, causing puddling.
- O. Surface of the asphalt concrete after compaction shall be smooth and true to a tolerance of 0.02 foot of the established cross section and grade, conforming to Section 00745.70 of OSS. Any mixture that become loose or broken, mixed with dirt, or is in any way defective, shall be removed and replaced with fresh hot mixture which, when compacted, shall conform to the surrounding area. There shall be no sign of roller marks. All costs in correcting defective surfaces shall be borne by the Contractor.

### **3.06 TOLERANCES**

- A. Flatness: Maximum variation of 1/4 inch measured with 10-foot straight edge.
- B. Variation from True Elevation: Within 1/2 inch.

### **3.07 SEAL COAT**

- A. Clean and prepare asphalt concrete surface per manufacturer recommendations.

- B. Apply seal coat to surface course in accordance with AI MS-19.

**3.08 FIELD QUALITY CONTROL**

- A. See Section 01-4000 - Quality Requirements, for general requirements for quality control.

**3.09 PROTECTION**

- A. Immediately after placement, protect pavement from mechanical injury for 7 days or until surface temperature is less than 140 degrees F.
- B. No traffic shall come in contact with any newly paved surface until surface has cooled and set sufficiently to prevent marking. The Contractor is responsible for this traffic control.
- C. After completion of paving, the Contractor shall remove from the site all debris resulting from the Contractor's operation.
- D. All costs incurred in the repair of deficiencies or damages shall be borne by the Contractor, and no additional compensation shall be due the Contractor.

**END OF SECTION**

BLANK PAGE

**SECTION 32-1313  
CONCRETE PAVING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete sidewalks, extruded curbs and concrete ramps, stair steps, extruded curbs and concrete ramps, integral curbs, extruded curbs and concrete ramps, and extruded curbs and concrete ramps.

**1.02 RELATED REQUIREMENTS**

- A. Section 03-3000 - Cast-in-Place Concrete.
- B. Section 32-1123 - Aggregate Base Courses: rock base course.

**1.03 REFERENCE STANDARDS**

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete 1991 (Reapproved 2009).
- B. ACI 301 - Specifications for Structural Concrete 2016.
- C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2018.
- E. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2015a.
- F. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2015.
- G. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method 2014.
- H. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) 2004 (Reapproved 2013).
- I. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction 2004a (Reapproved 2013).

**PART 2 PRODUCTS**

**2.01 PAVING ASSEMBLIES**

- A. Comply with applicable requirements of ACI 301.
- B. Concrete Sidewalks, Concrete Curbs, and Curb Gutters: 3,000 psi 28 day concrete, 4 inches thick, Portland cement, exposed aggregate finish.

## **2.02 FORM MATERIALS**

- A. Wood form material, profiled to suit conditions.
- B. Joint Filler: Preformed; non-extruding bituminous type (ASTM D1751) or sponge rubber or cork (ASTM D1752).
  - 1. Thickness: 1/2 inch.

## **2.03 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) yield strength; deformed billet steel bars; unfinished or as specified in plans.

## **2.04 CONCRETE MATERIALS**

- A. Obtain cementitious materials from same source throughout.
- B. Concrete Materials: As specified in Section 03-3000.

## **2.05 ACCESSORIES**

- A. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
  - 1. Manufacturers:
    - a. Nomaco, Inc; Nomaflex Expansion Joint Filler with Void Cap Option:  
[www.nomaco.com/#sle](http://www.nomaco.com/#sle).
    - b. Nomaco, Inc; Fastflex Slab Isolation Joint Filler with Tear-Off Strip:  
[www.nomaco.com/#sle](http://www.nomaco.com/#sle).
    - c. Substitutions: See Section 01-6000 - Product Requirements.

## **2.06 CONCRETE MIX DESIGN**

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
  - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.
- D. Concrete Properties:
  - 1. Compressive strength, when tested in accordance with ASTM C39/C39M at 28 days; 3,500 psi.
  - 2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
  - 3. Calcined Pozzolan Content: Maximum 10 percent of cementitious materials by weight.
  - 4. Silica Fume Content: Maximum 5 percent of cementitious materials by weight.
  - 5. Water-Cement Ratio: Maximum 40 percent by weight.
  - 6. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.
  - 7. Maximum Slump: 4 inches.
  - 8. Maximum Aggregate Size: 1-1/2 inch.

## **2.07 MIXING**



- A. Transit Mixers: Comply with ASTM C94/C94M.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

#### **3.02 SUBBASE**

- A. See Section 32-1123 for construction of base course for work of this Section.

#### **3.03 PREPARATION**

- A. Moisten base to minimize absorption of water from fresh concrete.
- B. Coat surfaces of manhole frames with oil to prevent bond with concrete pavement.
- C. Notify Architect minimum 24 hours prior to commencement of concreting operations.

#### **3.04 FORMING**

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

#### **3.05 REINFORCEMENT**

- A. Place reinforcement at midheight of slabs-on-grade.

#### **3.06 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304R.
- B. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.

#### **3.07 EXTRUDED CURBS**

- A. The pavement shall be dry and cleansed of loose or deleterious Materials prior to curb placement.
- B. Extruded cement concrete curb shall be placed, shaped and compacted true to line and grade with an approved extrusion machine. The extrusion machine shall be capable of shaping and thoroughly compacting the concrete to the required cross section.

- C. The cement concrete mixture shall be homogeneously mixed to conform with above when delivered to the hopper of the curb machine. Each hopper load of cement concrete shall be run through the curb laying machine, adjusted properly to form and compact the cement mix for the concrete curb.
- D. Joints in the extruded cement concrete curb shall be spaced at 15-foot intervals or shall match existing transverse joints or cracks in existing pavement. Joints shall be cut vertically.

### **3.08 JOINTS**

- A. Place 3/8 inch wide expansion joints at 20 foot intervals and to separate paving from vertical surfaces and other components and in pattern indicated.
- B. Provide scored joints.
  - 1. At 3 feet intervals, unless shown otherwise.
  - 2. Between sidewalks and curbs.

### **3.09 FINISHING**

- A. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.
- B. Median Barrier: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.
- C. Curbs and Gutters: Light broom, texture parallel to pavement direction.

### **3.10 TOLERANCES**

- A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.
- B. Maximum Variation From True Position: 1/4 inch.

### **3.11 PROTECTION**

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

### **3.12 SCHEDULES**

- A. All Drives, Parking Area: 5 inches.
- B. Sidewalks: 4 inches.

**END OF SECTION**

**SECTION 32-1713  
PARKING BUMPERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Parking bumpers.
- B. Adhesive.
- C. Steel bars for installation.

**1.02 REFERENCE STANDARDS**

- A. ODOT/APWA Oregon Standard Specifications for Construction, 2018 Edition.
  - 1. Epoxy - Section 02070.

**1.03 SUBMITTALS**

- A. General: Refer to Section 01-3000 - Administrative Requirements: Submittals, Shop Drawings, Product Data, and Samples, for submittal requirements and procedures.
- B. Shop Drawings: Submit Shop Drawings for bumpers, including plan layout and installation details, for approval.
- C. Product Data: Submit manufacturers' product data of precast bumpers and epoxy adhesive for approval.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Parking Bumpers:
  - 1. Provide precast concrete parking bumpers of half octagonal configuration and dimensions. Unless indicated otherwise, provide bumpers of 72"-inch length.
  - 2. Bumpers shall be manufactured of Class 4000 reinforced concrete - Portland Cement Concrete, to withstand constant use and rough service. Each bumper shall be reinforced with two No. 4 deformed steel reinforcing bars, minimum.
  - 3. Each bumper to be installed on at-grade asphalt pavement shall be manufactured with two holes to accommodate the installation rebar. Holes shall be positioned 6 inches in from each end.
- B. Adhesive: Adhesive for anchoring bumpers or wheel stops to pavement shall be an epoxy adhesive manufactured for the purpose, from ODOT/APWA QPL.
- C. Steel Bars for Installation: Rebar, No. 5 size, conforming to ASTM A615, Grade 60.
- D. Adhesive: Epoxy type.

**PART 3 EXECUTION**

**3.01    INSTALLATION**

- A. Precast concrete bumpers shall be anchored and secured in position on at-grade asphalt pavements, as indicated, with two No. 5 epoxy-coated rebar and an epoxy adhesive as specified in Article 2.01.B herein.

**END OF SECTION**

**SECTION 32-1723.13  
PAINTED PAVEMENT MARKINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Parking lot markings, including parking bays, crosswalks, arrows, handicapped symbols, and curb markings.
- B. Accessibility Signage.
- C. Roadway lane markings and crosswalk markings.

**1.02 RELATED REQUIREMENTS**

- A. Section 32-1216 - Asphalt Paving.
- B. Section 32-1313 - Concrete Paving.

**1.03 REFERENCE STANDARDS**

**1.04 SUBMITTALS**

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver paint in containers of at least 5 gallons accompanied by batch certificate.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

**1.06 FIELD CONDITIONS**

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Line and Zone Marking Paint: MPI (APL) No. 97 Latex Traffic Marking Paint; color(s) as indicated.
  - 1. Roadway Markings: As required by authorities having jurisdiction.
  - 2. Parking Lots: White.
  - 3. Handicapped Symbols: Blue.

- B. Crosswalks, Stop Bars and Arrows.
  - 1. Thermoplastic
    - a. Color - white.
    - b. Thermoplastic pavement markings shall be Type B (prefabricated retro reflective film) as specified in Section 00850 of the OSS.
- C. Signage: See Drawings.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### **3.02 PREPARATION**

- A. Allow new pavement surfaces to cure for a period of not less than 14 days before application of marking materials.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Clean surfaces thoroughly prior to installation.
  - 1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.
- D. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.

#### **3.03 INSTALLATION**

- A. Begin pavement marking as soon as practicable after surface has been cleaned and dried.
- B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F or more than 95 degrees F.
- C. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.
- D. Apply uniformly painted markings of color(s), lengths, and widths as indicated on drawings true, sharp edges and ends.
  - 1. Apply paint in one coat only.
  - 2. Wet Film Thickness: 0.015 inch, minimum.
  - 3. Width Tolerance: Plus or minus 1/8 inch.
- E. Roadway Traffic Lanes: Use suitable mobile mechanical equipment that provides constant agitation of paint and travels at controlled speeds.
  - 1. Conduct operations in such a manner that necessary traffic can move without hindrance.

2. Place warning signs at the beginning of the wet line, and at points well in advance of the marking equipment for alerting approaching traffic from both directions. Place small flags or other similarly effective small objects near freshly applied markings at frequent intervals to reduce crossing by traffic.
  3. If paint does not dry within expected time, discontinue paint operations until cause of slow drying is determined and corrected.
  4. Skip Markings: Synchronize one or more paint "guns" to automatically begin and cut off paint flow; make length of intervals as indicated.
  5. Use hand application by pneumatic spray for application of paint in areas where a mobile paint applicator cannot be used.
- F. Parking Lots: Apply parking space lines, entrance and exit arrows, painted curbs, and other markings indicated on drawings.
1. Mark the International Handicapped Symbol at indicated parking spaces.
  2. Hand application by pneumatic spray is acceptable.
- G. Symbols: Use a suitable template that will provide a pavement marking with true, sharp edges and ends, of the design and size indicated.
- H. Thermoplastic:
1. Crosswalks and stop bars shall be in accordance with ODOT/APWA Standard Detail Drawings TM503 and 501 respectively. Arrows shall be in accordance with ODOT APWA Standard Detail Drawings TM501 and placed at the same location of the existing directional arrows.
  2. After the pavement surface is clean and dry, apply a primer to the area receiving the thermoplastic pavement markings in a continuous, solid film according to the recommendations of the primer manufacturer and the thermoplastic manufacturer.
  3. Apply in accordance with Section 00850 of the OSS.

### **3.04 DRYING, PROTECTION, AND REPLACEMENT**

- A. Protect newly painted markings so that paint is not picked up by tires, smeared, or tracked.
- B. Provide barricades, warning signs, and flags as necessary to prevent traffic crossing newly painted markings.
- C. Allow paint to dry at least the minimum time specified by the applicable paint standard and not less than that recommended by the manufacturer.
- D. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.
- E. Remove markings in manner to avoid damage to the surface to which the marking was applied, using carefully controlled sand blasting, approved grinding equipment, or other approved method.
- F. Replace removed markings at no additional cost to Owner.

**END OF SECTION**

BLANK PAGE



**SECTION 32-1726  
TACTILE WARNING SURFACING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Plastic tactile and detectable warning tiles for pedestrian walking surfaces.

**1.02 RELATED REQUIREMENTS**

- A. Section 32-1313 - Concrete Paving: Concrete sidewalks.

**1.03 REFERENCE STANDARDS**

- A. Use current adopted addition(s).
- B. 49 CFR 37 - Transportation Services for Individuals with Disabilities (ADA) current edition.
- C. AASHTO LRFD - Bridge Design Specifications 2017, with Errata (2018).
- D. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- F. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus 2019.
- G. ASTM C501 - Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser 1984 (Reapproved 2015).
- H. ASTM C903 - Standard Practice for Preparing Refractory Specimens by Cold Gunning 2015, with Editorial Revision (2016).
- I. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine 2017.
- J. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents 2020.
- K. ASTM D570 - Standard Test Method for Water Absorption of Plastics 1998 (Reapproved 2018).
- L. ASTM D638 - Standard Test Method for Tensile Properties of Plastics 2014.
- M. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics 2015.
- N. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials 2017.
- O. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2015a.
- P. ASTM G155 - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials 2013.

- Q. ATBCB PROWAG - Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way 2011.

#### **1.04 SUBMITTALS**

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's product data, standard details, details specific to this project; written installation and maintenance instructions.
- C. Warranty: Submit manufacturer warranty; complete forms in Owner's name and register with manufacturer.

#### **1.05 WARRANTY**

- A. See Section 01-7800 - Closeout Submittals, for additional warranty requirements.
- B. Plastic Tiles: Provide manufacturer's standard five year warranty against manufacturing defects, breakage or deformation.

### **PART 2 PRODUCTS**

#### **2.01 TACTILE AND DETECTABLE WARNING DEVICES**

- A. Plastic Tactile and Detectable Warning Tiles: ADA Standards compliant, glass fiber and carbon fiber reinforced, exterior grade, matte finish polyester sheet with truncated dome pattern, solid color throughout, internal reinforcing of sheet and of truncated domes, integral radius cut lines on back face of tile; with factory-applied removable protective sheeting.
  - 1. Material Properties:
    - a. Water Absorption: 0.20 percent, maximum, when tested in accordance with ASTM D570.
    - b. Slip Resistance: 0.50 minimum dry static coefficient of friction, when tested in accordance with ASTM D2047.
    - c. Compressive Strength: 25,000 pounds per square inch, minimum, when tested in accordance with ASTM D695.
    - d. Tensile Strength: 10,000 pounds per square inch, minimum, when tested in accordance with ASTM D638.
    - e. Flexural Strength: 25,000 pounds per square inch minimum, when tested in accordance with ASTM D790.
    - f. Chemical Stain Resistance: No reaction to 1 percent hydrochloric acid, motor oil, calcium chloride, gum, soap solution, bleach, or antifreeze, when tested in accordance with ASTM D543.
    - g. Abrasion Resistance: 300, minimum, when tested in accordance with ASTM C501.
    - h. Flame Spread Index: 25, maximum, when tested in accordance with ASTM E84.
    - i. Accelerated Weathering: Delta-E of less than 5.0 at 2,000 hours exposure, when tested in accordance with ASTM G155.
    - j. Adhesion: No delamination of tile prior to board failure in a temperature range of 20 to 180 degrees F, when tested in accordance with ASTM C903.
    - k. Loading: No damage when tested according to AASHTO LRFD test method HS20.
    - l. Salt and Spray Performance: No deterioration or other defect after 200 hours of exposure, when tested in accordance with ASTM B117.
  - 2. Installation Method: Surface applied.
  - 3. Shape: As shown on Drawings.

4. Dimensions: 24 inches by 48 inches, except where otherwise indicated on Drawings.
5. Pattern: In-line pattern of truncated domes complying with ADA Standards.
6. Color: FED-STD-595C, Table IV, Federal Yellow No. 33538.
7. Products:
  - a. ADA Solutions, LLC; Surface Applied System: [www.adatale.com/#sle](http://www.adatale.com/#sle).
  - b. ADA Solutions, LLC; Surface Applied Tactile Warning Tile for Transit Use:: [www.adatale.com](http://www.adatale.com).
  - c. Armor-Tile, a brand of Engineered Plastics, Inc; Surface Applied Tactile Tile for Transit: [www.armortile.com](http://www.armortile.com).

## **2.02 ACCESSORIES**

- A. Fasteners: ASTM A666, Type 304 stainless steel
  1. Type: Countersunk, color matched composite sleeve anchors
  2. Size: 1/4 inch diameter and 1-1/2 inches long.
- B. Adhesive: Type recommended and approved by surfacing tile manufacturer.
- C. Sealant: Urethane elastomeric or polyether structural sealant of color to match adjacent surfaces; approved by surfacing tile manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. When installation location is near site boundary or property line, verify required location using property survey.
- B. Verify that work area is ready to receive work:
  1. If existing conditions are not as required to properly complete the work of this section, notify Architect.
  2. Do not proceed with installation until deficiencies in existing conditions have been corrected.
- C. Verify that dimensions, tolerances, and attachment methods for work in this section are properly coordinated with other work on site.

### **3.02 INSTALLATION, GENERAL**

- A. Install in accordance with manufacturer's written instructions.
  1. Do not install damaged, warped, bowed, dented, abraded, or otherwise defective units.
  2. Do not install when ambient or substrate temperature has been below 40 degrees F during the preceding 8 daylight hours.
- B. Field Adjustment:
  1. Locate relative to curb line in compliance with ATBCB PROWAG, Sections 304 and 305.
  2. Orient so dome pattern is aligned with the direction of ramp.
- C. Install units fully seated to substrate, square to straight edges and flat to required slope.

### **3.03 INSTALLATION, SURFACE APPLIED PLASTIC TILES**

- A. Cure concrete surfaces for a minimum of 4 days before installing units.

- B. Mechanically roughen surface as required to remove contaminants and prepare surface for adhesive and sealant application.
- C. Drill fastener holes straight, true and to depth recommended by manufacturer.
- D. Apply adhesive to back of unit as recommended by manufacturer.
- E. Mechanically fasten to substrate. Avoid striking or damaging the unit itself during installation.
- F. Apply sealant to edges in cove profile.

**3.04 CLEANING PLASTIC UNITS**

- A. Remove protective plastic sheeting within 24 hours of installation.
- B. Remove excess sealant or adhesive from joints and edges.
- C. Clean four days prior to date of scheduled inspection.

**3.05 PROTECTION**

- A. Protect installed units from traffic, subsequent construction operations or other imposed loads until concrete is fully cured.
- B. Touch-up, repair or replace damaged products prior to Date of Substantial Completion.

**END OF SECTION**