

PROJECT MANUAL

ALGIERS PEDIATRIC OFFICE  
DR. CRESSWELL

3500 KABEL DRIVE  
NEW ORLEANS, LOUISIANA 70131

VRA Project Number 14072

1 July 2015

**VergesRome Architects**  
*New Orleans, Louisiana*



320 N. Carrollton Ave. Suite 100  
New Orleans, LA 70119  
t: 504.488.7739 f: 504.488.7743



PROJECT MANUAL FOR:

**ALGIERS PEDIATRIC OFFICE  
DR. CRESSWELL**

**3500 KABEL DRIVE  
NEW ORLEANS, LOUISIANA 70131**

VRA Project Number 14072

**ARCHITECT**

VergesRome Architects APAC  
320 N. Carrollton Avenue, Suite 100  
New Orleans, LA 70119  
P. 504.488.7739  
F. 504.488.7743  
Contact: Chip Verges

**CIVIL ENGINEER**

Robert A. Bouchon Consulting Engineer, LLC  
1050 Jefferson Davis Pkwy., #314  
New Orleans, LA 70119  
P. 504.304.2312  
F. 626.876.0453  
Contact: Robert Bouchon, P.E.

**STRUCTURAL ENGINEER**

Robert A. Bouchon Consulting Engineer, LLC  
1050 S. Jefferson Davis Pkwy., #314  
New Orleans, LA 70119  
P. 504.304.2312  
F. 626.876.0453  
Contact: Robert Bouchon, P.E.

**MECHANICAL ENGINEER**

Professional Engineering Services  
15 Cypress Point Lane  
New Orleans, LA 70131  
P. 504.866.2600  
F. 504.218.8480  
Contact: Damien Serauskas

**ELECTRICAL ENGINEER**

Drake Engineering  
2783 Lapalco Blvd.  
Harvey, LA 70058  
P. 504.368.1575  
F: 504.361.7890  
Contact: Mark Kattengell



**ALGIERS PEDIATRIC OFFICE – DR. CRESSWELL  
3500 KABEL DRIVE  
NEW ORLEANS, LA 70131**

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The following specification sections included in this Project Manual were prepared by or under the responsible supervision of the company listed below:

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01 25 00	SUBSTITUTION PROCEDURES
01 26 00	CONTRACT MODIFICATION PROCEDURES
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08 41 13	ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS
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08 91 19           FIXED LOUVERS

09 29 00           GYPSUM BOARD  
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32 00 00           BIRD PROOFING  
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32 92 00           TURF AND GRASSES  
32 93 00           PLANTS



Ernest E. "Chip" Verges, II  
VergesRome Architects

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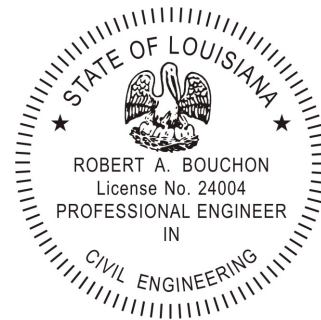
**SECTION 00 00 08 – CERTIFICATION OF RESPONSIBILITY FOR DOCUMENT PREPARATION**

**ALGIERS PEDIATRIC OFFICE – DR. CRESSWELL**

**CIVIL/STRUCTURAL SPECIFICATIONS**

The following specification sections included in this Project Manual were prepared by or under the responsible supervision of the company listed below:

03 30 00	CAST-IN-PLACE CONCRETE
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06 10 00	ROUGH CARPENTRY
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32 13 13	CONCRETE PAVING
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*Robert Bouchon*  
05/07/15

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Robert A. Bouchon, PE  
Robert A. Bouchon, Consulting Engineer, LLC

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## SECTION 00 00 08 – CERTIFICATION OF RESPONSIBILITY FOR DOCUMENT PREPARATION

### ALGIERS PEDIATRIC OFFICE – DR. CRESSWELL

#### MECHANICAL SPECIFICATIONS

The following specification sections included in this Project Manual were prepared by or under the responsible supervision of the company listed below:

22 00 00	PLUMBING
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23 05 01	BASIC MECHANICAL MATERIALS AND METHODS
23 05 93	TESTING, ADJUSTING, AND BALANCING
23 07 00	MECHANICAL INSULATION
23 09 00	HVAC CONTROL SYSTEMS
23 20 00	PIPING AND VALVES
23 70 00	HVAC DUCTWORK AND EQUIPMENT



Damien W. Serauskas, PE  
Professional Engineering Services



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## SECTION 00 00 08 – CERTIFICATION OF RESPONSIBILITY FOR DOCUMENT PREPARATION

### ALGIERS PEDIATRIC OFFICE – DR. CRESSWELL

#### ELECTRICAL SPECIFICATIONS

The following specification sections included in this Project Manual were prepared by or under the responsible supervision of the company listed below:

26 01 00	BASIC ELECTRICAL REQUIREMENTS
26 05 00	BASIC ELECTRICAL MATERIALS AND METHODS
26 20 00	PANELBOARDS
26 50 00	LIGHTING FIXTURES



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Ryan Orgeron, PE  
Drake Engineering

**END OF CERTIFICATION OF RESPONSIBILITY FOR DOCUMENT PREPARATION**

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## SECTION 00 21 13 - INSTRUCTIONS TO BIDDERS

### PART 1 - GENERAL

#### 1.1 FORM OF PROPOSAL

- A. Each bid must be completed in duplicate, placed in a sealed envelope, with Contractor's license number on front of envelope, and delivered or mailed to the following address:

VergesRome Architects, APAC  
320 North Carrollton Ave., Ste. 100  
New Orleans, Louisiana 70119

Re: Bid for **Algiers Pediatric Office – Dr. Cresswell**  
3500 Kabel Drive  
New Orleans, Louisiana 70131

- B. All bids must be made in writing and in figures, on the form furnished by the Architect. Any other form of proposal, or any departure from said form of proposal furnished by Architect, could render the bid informal and cause its rejection. All bids must be signed by the Contractor, and in the case of a firm or of a corporation, the party signing the bid for said firm or corporation must file with the bid legal evidence of his authority to sign said bid.
- C. Bidders are cautioned not to attach any conditions, provisos or recapitulation of the work to be done to their proposals, unless specifically directed. Any foreign conditions may render the proposal informal and cause its rejection.
- D. Any proposal which fails to name a price both in figures and in writing may be deemed informal and rejected; in case of any discrepancy between the price written in the bid and that given in figures, the price in writing will be considered as the bid.
- E. Erasures or other changes in the bid must be explained or noted over the signature of the bidder. Failure to do so may cause rejection of the bid.
- F. Bids will be received on **Thursday, August 13, 2015 at 2:00pm** at the offices of VergesRome Architects; 320 N. Carrollton Avenue, Suite 100; New Orleans, Louisiana 70119.
- G. Bids must be received as indicated above. No electronically submitted bids will be considered.
- H. Bids will be opened privately.

#### 1.2 PRE-BID CONFERENCE

- A. A Pre-Bid Conference will be held at **10:00am on Thursday, July 23, 2015** at the project site; 3500 Kabel Drive; New Orleans, LA 70131.

#### 1.3 WITHDRAWAL OF BIDS

- A. Bids may be withdrawn on written or telegraphic request dispatched by the bidder in time for delivery in the normal course of business prior to the time fixed for opening, provided that written confirmation of any telegraphic withdrawal over the signature of bidder is received by the owner prior to the time set for bid opening. Negligence on the part of the bidder in preparing his bid confers no right of withdrawal or modification of his bid after bids have been opened.
- B. No proposal may be withdrawn within thirty (30) days after the above scheduled time of opening of bids.

#### 1.4 INTERPRETATION OF DOCUMENTS

- A. If any person contemplating a bid for the proposed contract is in doubt as to the meaning of any part of the plans, specifications, or other proposed contract documents, he should immediately contact Architect or Engineer for interpretation. If interpretation will affect cost of project, all bidders will be informed by phone and by Addenda.

#### 1.5 AWARD OR REJECTION OF BIDS

- A. Contract awards are made with the understanding that the Contractor is familiar with all conditions pertaining to his work and has made all allowances in his bid.
- B. The contract will be awarded to the responsible bidder complying with the conditions as set forth herein, provided his bid is reasonable, and it is to the interest of the Owner to accept it.
- C. The Owner reserves the right to reject any and all bids, waive any or all informalities or accept any bids which in his opinion appear to be best. He also reserves the right to accept any alternates or parts of alternates that may serve his best interest.

#### 1.6 INVITED LIST OF BIDDERS

- A. Artigues Construction  
1215 Fried Street  
Gretna, LA 70053  
504.368.3732
- B. Cannon Medical, Inc.  
9605 Jefferson Hwy. S-1-169  
River Ridge, LA 70123
- C. Boudreaux Nathan Builders, Inc.  
P.O. Box 2004  
Gretna, LA 70054  
504.392.5680

#### 1.7 DISTRIBUTION OF CONTRACT DOCUMENTS

- A. The plans and specifications for the proposed work are on file and may be reviewed at the offices of VergesRome Architects; 320 N. Carrollton Avenue, Suite 100; New Orleans, Louisiana 70119.
- B. Architect will provide plans and specifications to invited Bidders.
- C. Subcontractors and Material Suppliers must secure plans and specifications from invited Bidders.
- D. Addenda issued during the time of bidding are to be covered in the bid and, in closing the contract, will form part thereof.

#### 1.8 COMPLETION TIME

- A. **Base Bid:** The Bidder shall agree to achieve Substantial Completion of the entire Work that is the subject of the Contract Documents within the time set forth in the Agreement Between the Owner and the Contractor, AIA Document A101, as modified by the Owner, which is **Two Hundred Seventy (270)** consecutive calendar days, subject to adjustment of this Contract Time as may be provided in the Contract Documents. Bidder acknowledges and agrees that this Contract Time will commence on the date specified in the written "Notice to Proceed" from the Owner.

- B. **Alternate No. 1:** Same as Base Bid, except Substantial Completion shall be obtained within **Two Hundred Ten (210)** consecutive calendar days.

**1.9 LIQUIDATED DAMAGES**

- A. Liquidated Damages will be assessed the Contractor in the amount of **Three Hundred Dollars (\$300.00)** per **calendar day** for each day the work is not substantially completed after the Contract Completion Date.

**END OF SECTION 00 21 13**



## DOCUMENT 00 26 00 - PROCUREMENT SUBSTITUTION PROCEDURES

### 1.1 DEFINITIONS

- A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.
- B. Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Contract Documents, submitted following Contract award. See Section 01 25 00 "Substitution Procedures" for conditions under which Substitution requests will be considered following Contract award.

### 1.2 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

### 1.3 PROCUREMENT SUBSTITUTIONS

- A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.
- B. Procurement Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by Architect; otherwise requests will be returned without action:
  - 1. Extensive revisions to the Contract Documents are not required.
  - 2. Proposed changes are in keeping with the general intent of the Contract Documents, including the level of quality of the Work represented by the requirements therein.
  - 3. The request is fully documented and properly submitted.

### 1.4 SUBMITTALS

- A. Procurement Substitution Request: Submit to Architect. Procurement Substitution Request must be made in writing by prime contract Bidder only in compliance with the following requirements:
  - 1. Requests for substitution of materials and equipment will be considered if received no later than 10 days prior to date of bid opening.
  - 2. Submittal Format: Submit three copies of each written Procurement Substitution Request, using CSI Substitution Request Form 1.5C.
    - a. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specifications Sections and drawing numbers.
    - b. Provide complete documentation on both the product specified and the proposed substitute, including the following information as appropriate:
      - 1) Point-by-point comparison of specified and proposed substitute product data, fabrication drawings, and installation procedures.
      - 2) Copies of current, independent third-party test data of salient product or system characteristics.

- 3) Samples where applicable or when requested by Architect.
  - 4) Detailed comparison of significant qualities of the proposed substitute with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
  - 5) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
  - 6) Research reports, where applicable, evidencing compliance with building code in effect for Project, from ICC-ES.
  - 7) Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, which will become necessary to accommodate the proposed substitute.
- c. Provide certification by manufacturer that the substitute proposed is equal to or superior to that required by the Procurement and Contracting Documents, and that its in-place performance will be equal to or superior to the product or equipment specified in the application indicated.
  - d. Bidder, in submitting the Procurement Substitution Request, waives the right to additional payment or an extension of Contract Time because of the failure of the substitute to perform as represented in the Procurement Substitution Request.
- B. Architect's Action:
1. Architect may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. Architect will notify all bidders of acceptance of the proposed substitute by means of an Addendum to the Contract Documents.
- C. Architect's approval of a substitute during bidding does not relieve Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents.

END OF DOCUMENT 00 26 00

**SECTION 00 42 00 - FORM OF PROPOSAL**

**BID FOR:**  
**ALGIERS PEDIATRIC OFFICE – DR. CRESSWELL**  
**3500 KABEL DRIVE**  
**NEW ORLEANS, LOUISIANA 70131**

Gentlemen:

I (We) the undersigned \_\_\_\_\_ a corporation, organized and existing under the law of the State of Louisiana, Partnership consisting of \_\_\_\_\_, or an individual trading as \_\_\_\_\_ do hereby declare that I (We) have carefully examined the plans and specifications and general conditions of the contract, and having personally inspected the site, that I (We) have a clear understanding of the said documents. I (We) hereby propose to provide the necessary tools, machinery, apparatus, and other means of construction, and to furnish all labor and materials specified in the contract, or called for by the plans and specifications necessary to complete and finish, in a thoroughly workmanlike manner, the building renovations.

**BASE BID:** \_\_\_\_\_  
\_\_\_\_\_ Dollars (\$ \_\_\_\_\_).

**ALTERNATE NO. 1:** \_\_\_\_\_  
\_\_\_\_\_ Dollars (\$ \_\_\_\_\_).

**COMPLETION DATE**

The Contractor agrees to complete the Work in 270 consecutive calendar days (Base Bid), or 210 consecutive calendar days (Alternate No. 1).

**CONTRACT BOND**

If the undersigned is notified of the acceptance of the bid within thirty (30) days of the time set for the opening of bids, he agrees to execute a contract for the work accepted, in the standard A.I.A. contract form, within seventy-two (72) hours notice from the Architect, that the instrument is ready for signature.

**ADDENDA**

The undersigned acknowledges receipt of the following addenda (Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging): \_\_\_\_\_  
\_\_\_\_\_.

The undersigned agrees that this bid shall be good and may not be withdrawn for a period of thirty (30) calendar days after the scheduled closing time for receiving bids.

Respectfully submitted:

LOUISIANA STATE LICENSE NO.: \_\_\_\_\_

NAME OF BIDDER: \_\_\_\_\_

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

BUSINESS ADDRESS: \_\_\_\_\_

END OF SECTION 00 42 00



# AIA<sup>®</sup> Document A101<sup>™</sup> – 2007

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

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

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

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

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

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

VergesRome Architects, APAC  
320 North Carrollton Ave.  
Ste. 100  
New Orleans, LA 70119  
Telephone Number: 504-488-7739  
Fax Number: 504-488-7743

The Owner and Contractor agree as follows.

### **ADDITIONS AND DELETIONS:**

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

AIA Document A201<sup>™</sup>-2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

## TABLE OF ARTICLES

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

### ARTICLE 1 THE CONTRACT DOCUMENTS

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

### ARTICLE 2 THE WORK OF THIS CONTRACT

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

### ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

*(Insert the date of commencement if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)*

If, prior to the commencement of the Work, the Owner requires time to file mortgages and other security interests, the Owner's time requirement shall be as follows:

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

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than ( ) days from the date of commencement, or as follows:

*(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)*

Init.

**Portion of Work**

**Substantial Completion Date**

, subject to adjustments of this Contract Time as provided in the Contract Documents.  
*(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)*

**ARTICLE 4 CONTRACT SUM**

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

§ 4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:  
*(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)*

§ 4.3 Unit prices, if any:  
*(Identify and state the unit price; state quantity limitations, if any, to which the unit price will be applicable.)*

Item	Units and Limitations	Price Per Unit (\$0.00)
------	-----------------------	-------------------------

§ 4.4 Allowances included in the Contract Sum, if any:  
*(Identify allowance and state exclusions, if any, from the allowance price.)*

Item	Price
------	-------

**ARTICLE 5 PAYMENTS**

**§ 5.1 PROGRESS PAYMENTS**

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

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

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the day of a month, the Owner shall make payment of the certified amount to the Contractor not later than the day of the month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than ( ) days after the Architect receives the Application for Payment.  
*(Federal, state or local laws may require payment within a certain period of time.)*

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

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

§ 5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- .1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of percent ( %). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction;
- .2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of percent ( %);
- .3 Subtract the aggregate of previous payments made by the Owner; and
- .4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201–2007.

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

- .1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and  
(Section 9.8.5 of AIA Document A201–2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)
- .2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201–2007.

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

*(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)*

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

## § 5.2 FINAL PAYMENT

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

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

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

## ARTICLE 6 DISPUTE RESOLUTION

### § 6.1 INITIAL DECISION MAKER

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

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

**§ 6.2 BINDING DISPUTE RESOLUTION**

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A201–2007, the method of binding dispute resolution shall be as follows:

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

- Arbitration pursuant to Section 15.4 of AIA Document A201–2007
- Litigation in a court of competent jurisdiction
- Other *(Specify)*

**ARTICLE 7 TERMINATION OR SUSPENSION**

**§ 7.1** The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007.

**§ 7.2** The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

**ARTICLE 8 MISCELLANEOUS PROVISIONS**

**§ 8.1** Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

**§ 8.2** Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located. *(Insert rate of interest agreed upon, if any.)*

%

**§ 8.3** The Owner's representative:  
*(Name, address and other information)*

**§ 8.4** The Contractor's representative:  
*(Name, address and other information)*

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

§ 8.6 Other provisions:

#### ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A101-2007, Standard Form of Agreement Between Owner and Contractor.

§ 9.1.2 The General Conditions are AIA Document A201-2007, General Conditions of the Contract for Construction.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

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

§ 9.1.4 The Specifications:

*(Either list the Specifications here or refer to an exhibit attached to this Agreement.)*

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

§ 9.1.5 The Drawings:

*(Either list the Drawings here or refer to an exhibit attached to this Agreement.)*

Number	Title	Date
--------	-------	------

§ 9.1.6 The Addenda, if any:

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

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

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents:

- .1 AIA Document E201™-2007, Digital Data Protocol Exhibit, if completed by the parties, or the following:
- .2 Other documents, if any, listed below:  
*(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201-2007 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents)*

*unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)*

**ARTICLE 10 INSURANCE AND BONDS**

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201-2007.

*(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201-2007.)*

**Type of insurance or bond**

**Limit of liability or bond amount (\$0.00)**

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

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

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

\_\_\_\_\_  
*(Printed name and title)*

\_\_\_\_\_  
*(Printed name and title)*



# AIA<sup>®</sup> Document A201<sup>™</sup> – 2007

## ***General Conditions of the Contract for Construction***

for the following PROJECT:

*(Name and location or address)*

BlankForms

**THE OWNER:**

*(Name, legal status and address)*

**THE ARCHITECT:**

*(Name, legal status and address)*

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- 14 TERMINATION OR SUSPENSION OF THE CONTRACT
- 15 CLAIMS AND DISPUTES

### 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.

Init.

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## **ARTICLE 1 GENERAL PROVISIONS**

### **§ 1.1 BASIC DEFINITIONS**

#### **§ 1.1.1 THE CONTRACT DOCUMENTS**

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding 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 and certify termination of the Agreement under Section 14.2.2.

### **§ 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.

§ 1.2.2 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 will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment 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 this 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 material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them 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 material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

### § 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

## 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 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the

portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 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.

§ 2.2.3 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.

§ 2.2.4 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.

§ 2.2.5 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.

### § 2.3 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.

### § 2.4 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 written 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 deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor 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. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

## 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 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 2.2.3, 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 make 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 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, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and 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 written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required 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.

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§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 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

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.

### § 3.6 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 21 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 an equitable adjustment 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 in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed 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 furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply 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 SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be 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, 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 maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be 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 the way by which 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 requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing 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 written 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. 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 cause such services or certifications to be provided by a properly 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, accuracy and

completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, 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. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

### **§ 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, and 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 and patching shall be restored to the condition existing prior to the cutting, fitting and 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 such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's 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 or 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 Owner shall be entitled to reimbursement from the Contractor.

### **§ 3.16 ACCESS TO WORK**

The Contractor shall provide the Owner and Architect 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 such 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 the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such 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 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.

§ 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.

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

##### **§ 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, except as provided in Section 3.3.1.

§ 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 report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) 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 FACILITATING CONTRACT ADMINISTRATION**

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 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 13.5.2 and 13.5.3, whether or not such 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, material and equipment 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, unless otherwise specifically stated by the Architect, 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 authorize 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 duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 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 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 or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply 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 previously selected if the Owner or Architect makes reasonable objection to such substitution.

## § 5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, 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, which the Contractor, by these 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 in writing; 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 such 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 Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

**§ 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 other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the 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, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor 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 report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report 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, except as to defects not then reasonably discoverable.

**§ 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 the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

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

### **§ 6.3 OWNER'S RIGHT TO CLEAN UP**

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

## **ARTICLE 7 CHANGES IN THE WORK**

### **§ 7.1 GENERAL**

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

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

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, 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 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 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.

§ 7.3.6 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.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and 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 7.3.7 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- .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 related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 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 has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

### 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, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 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 an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order 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

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.

### § 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's 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. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material 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 material 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, material suppliers, or other persons or entities making a claim by reason of having 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 issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part 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 comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. 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. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. 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 material 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 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 the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

**§ 9.5.3** 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 material or equipment suppliers 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 Architect will reflect such payment on the next Certificate 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.

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§ 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 material and equipment 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 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, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment 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 and 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, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

#### § 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' written 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 shut-down, 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, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall 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 such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such 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 as required under Section 11.3.1.5 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 written 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 and, 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 terms and conditions of 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 and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial 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 and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, 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. If such lien 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 such lien, 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 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 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; or
- .3 terms of special warranties required by the Contract Documents.

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

## ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

### § 10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

### § 10.2 SAFETY OF PERSONS AND PROPERTY

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

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; 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 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 owners and users of adjacent sites and utilities.

§ 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, except damage or loss 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, written notice of such 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

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. 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 report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written 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 such material or substance or who are to perform the task of removal or safe containment of such 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 in the amount of the Contractor's reasonable additional costs of shut-down, 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 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 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 indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance 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 indemnify the Contractor for all cost and expense thereby incurred.

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## § 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 LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

### § 11.2 OWNER'S LIABILITY INSURANCE

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

### **§ 11.3 PROPERTY INSURANCE**

**§ 11.3.1** Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

**§ 11.3.1.1** Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

**§ 11.3.1.2** If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

**§ 11.3.1.3** If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

**§ 11.3.1.4** This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

**§ 11.3.1.5** Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

### **§ 11.3.2 BOILER AND MACHINERY INSURANCE**

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

### **§ 11.3.3 LOSS OF USE INSURANCE**

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

**§ 11.3.4** If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

**§ 11.3.5** 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, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

#### § 11.3.7 WAIVERS OF SUBROGATION

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, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, 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 covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance 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 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

#### § 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 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.

## **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, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

### **§ 12.2 CORRECTION OF WORK**

#### **§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION**

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after 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 an 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 written 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 2.4.

**§ 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, whether completed or partially completed, of the Owner or separate contractors 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 except that, 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 such 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 such assignment.

### **§ 13.3 WRITTEN NOTICE**

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

### **§ 13.4 RIGHTS AND REMEDIES**

**§ 13.4.1** 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.

**§ 13.4.2** 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 there under, except as may be specifically agreed in writing.

### **§ 13.5 TESTS AND INSPECTIONS**

**§ 13.5.1** 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 (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

**§ 13.5.2** 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 13.5.1, 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 13.5.3, shall be at the Owner's expense.

**§ 13.5.3** If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 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.

§ 13.5.4 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.

§ 13.5.5 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.

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

#### § 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may 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.

#### § 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time 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 13.7.

### 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 or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, 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 promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, 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' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor 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' written 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 for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .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 above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, 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' written 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 as described in 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 written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

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

**§ 14.4.3** In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

## 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, 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.

#### § 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written 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 must 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 CONTINUING CONTRACT PERFORMANCE

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. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

#### § 15.1.4 CLAIMS FOR ADDITIONAL COST

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

#### § 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein 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.

§ 15.1.5.2 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.

#### § 15.1.6 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 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

### § 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, 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 arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no 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 such 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 an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, 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 15.1.6 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 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. 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 Either party, at its sole discretion, 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 Either party, at its sole discretion, 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 the Owner and Contractor under this Agreement.

## SECTION 00 73 00 - SUPPLEMENTARY CONDITIONS

The following Supplementary Conditions modify, amend, or delete the "General Conditions of the Contract for Construction", AIA Document A201-2007 Edition. Where any Article, Paragraph, Section, Sentence or Clause of the General Conditions is modified, amended, or deleted by these Supplementary Conditions, the unaltered provisions thereof shall remain in effect. Articles, Paragraphs, Sections, or Clauses modified or deleted have the same numerical designation as those occurring in the General Conditions.

The General Conditions of these specifications, including amendments and additions thereto, apply to each and every heading included in these specifications with the same force as though repeated in full under each heading respectively.

### ARTICLE 1

#### GENERAL PROVISIONS

#### 1.1 BASIC DEFINITIONS

##### 1.1.1 THE CONTRACT DOCUMENTS

*In Section 1.1.1 delete the third sentence and substitute the following:*

"The Contract Documents shall include the Advertisement for Bids, Instruction to Bidders, Bid Form, and the Bidding Documents and Contract Documents as listed in Article 1 of the Instruction to Bidders, and all modifications made thereto by Addenda."

*Add the following complete Section 1.1.9 to 1.1 following 1.1.8:*

##### 1.1.8 PRODUCT

The term "product" includes materials, systems, and equipment.

##### 1.1.9 MISCELLANEOUS DEFINITIONS

1.1.9.1 The terms "building code" and "code" refer to regulations of governmental entities having jurisdiction.

1.1.9.2 The terms "acceptable", "required", and "as directed" refer to or indicate work or materials that may be acceptable or approved by the Architect, as the Owner's representative during the construction phase, only to the extent the work or materials conform to the requirements of the Contract Documents and in no way shall be interpreted to imply any responsibility on the part of the Architect concerning the Contractor's obligations under Section 3.3, 3.11, 3.12, 4.2, and 10.2.

1.1.9.3 The term "similar" means in its general sense and not necessarily identical.

1.1.9.4 The terms "shown", "indicated", "detailed", "noted", "scheduled" and other similar terms refer to requirements contained in the Contract Documents.

1.1.9.5 The term "equal" means equal in quality and monetary value and similar in design or properties, in the Architect's opinion.

1.1.9.6 The term "products" means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.

1.1.9.7 The term "furnish" means to supply and deliver, unload, and inspect for damage.

1.1.9.8 The term "install" means to unpack, assemble, erect, apply, place, finish, cure, protect, clean, and make ready for use.

1.1.9.9 The term "provide" means to furnish and install.

## 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

*Add the following to Section 1.2.3*

"Any reference to standards (such as ASTM - American Society for Testing and Materials), shall mean the latest edition of such standards published prior to the date of the Contract Documents. Where such a reference is made, the applicable standard is hereby made a part of the Contract Documents which refers to it to the same extent as if written out in the Contract Documents in full."

## 1.4 INTERPRETATION

*Add the following:*

"1.4.2 In any discrepancy between scale and dimensions, figured dimensions shall override. Unless otherwise noted, the Drawings are drawn to scale as indicated, and dimensions are given; however, the Contractor shall provide Work to measurements of existing construction."

"1.4.3 In the case of an inconsistency and/or discrepancy between the Drawings and the Specifications, or within either Documents, not clarified by Addendum, the Contractor shall provide the more expensive, better quality of Work, materials and equipment, unless otherwise decided differently by the interpretation of the Architect."

"1.4.4 All Work required by the Drawings or specified in the Specifications shall be executed, whether covered in one only or in both. The Contractor shall do such Work as may not be expressly set forth in either the Drawings or the Specifications, but which, in the opinion of the Architect/Engineer, is reasonably necessary to properly complete the job in a manner conformable to the general requirements (style, design, etc.) as indicated by Drawings and Specifications."

"1.4.5 Should the Contractor fail to request interpretations of questionable items in the Contract Documents prior to executing the Work, neither the Owner nor the Architect will thereafter entertain an excuse for failing to execute the Work in a satisfactory manner."

"1.4.6 Where a given material is indicated on the Drawings, or specified in the Specifications, it shall be provided throughout the length and height of walls, partitions, spandrels, panels, windows, light areas, etc. or in the assembly detail in which it occurs, for other similar locations throughout the building or Project, unless another material is indicated."

"1.4.7 All manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, leaned, prepared, and conditioned in strict accordance with the manufacturers written or printed directions and instructions, unless specified exceptions or other requirements are indicated in the Contract Documents."

"1.4.8 Even though all intricate, minute details and parts are not indicated on the Drawings and specified in the Specifications, all materials, equipment, systems, and assembles shall be provided in a complete, whole and properly functioning manner in accordance with manufacturer's requirements. Provide all detailed Work required to complete all portions of the Work."

## 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

*Add the following Section after Section 1.5.2:*

"1.5.3 The Contractor represents and warrants that his investigation of the site was performed in sufficient detail to disclose the

conditions and limitations under which Work is to be performed, including without limitation; (1) the location, condition, layout, and nature of the Project site and surrounding areas; (2) generally prevailing climatic conditions; (3) anticipated labor supply and cost; (4) availability and cost of materials, tools, and equipment; and (5) other similar issues. Except as set forth in Section 10.1.2, the Contractor shall be solely responsible for providing a safe place for the performance of the Work."

*Add the following Section after Section 1.5.3:*

- "1.5.4 The Contractor, at his own expense, shall record a duplicate copy of the original Contract and the Performance and Labor and Material Bond (s) with the Clerk of Court in the Parish where the Work is to be performed before the Work commences. Submit to the Architect a copy of an official certificate of recordation indicating the date(s) the Contract and bond(s) were recorded."

## ARTICLE 2

### OWNER

#### 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

*In Section 2.4.1, replace the first two sentences with the following:*

"If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven-day period after receipt of written 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, correct such deficiency."

## ARTICLE 3

### CONTRACTOR

#### 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

*Add the following sentence to Section 3.2.1:*

"After reporting to the Architect any error, inconsistency or omission discovered in the Contract Documents, the Contractor shall not proceed with any Work so affected without the Architect's written approval."

*Add the following Section 3.2.5:*

"3.2.5 In case of inconsistencies in the Specifications or the Drawings, or between the Specifications and Drawings, the Architect will determine which requirement will be the most consistent with design intent and this requirement will be complied with by the Contractor. The difference in cost between the interpretations shall be a factor in Architect's decision and Contractor shall benefit from any interpretation by the Architect that would decrease his cost and would likewise bear any cost increase by the Architect's interpretation."

#### 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

*Add the following:*

- "3.3.4 The Contractor shall take all precautions necessary to prevent loss or damage caused by vandalism, theft, burglary, pilferage, or any unexplained disappearance of property of the Owner. The Contractor shall have full responsibility for the security of such property of the Owner for any such loss, damage, or injury."

#### 3.6 TAXES

*Add the following:*

"Bidder shall include in bid price all applicable sales and use taxes, which taxes shall be promptly paid as due."

### 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

Delete Section 3.7.1 and add the following:

"3.7.1 The Owner shall pay for the initial building permit unless specifically stated otherwise. The General Contractor and/or the Sub-contractor shall secure and pay for any additional building permits and other permits and governmental fees, licenses and inspections necessary for the proper execution and completion of the Work, unless indicated differently in Special Conditions."

Add the following to Section 3.7.2:

"3.7.2 The Contractor shall secure certificates of inspection, use, occupancy, permits, and licenses with all such certificates to be delivered to the Architect when the Contractor considers the Work to be Substantially Complete."

Add the following Sections:

"3.7.6 The Contractor, and his mechanical, electrical, and fire alarm/fire suppressive Subcontractors shall attend all inspections for Substantial Completion, and inspections for occupancy conducted by the Louisiana State Fire Marshal, and other local officials."

"3.7.7 The Contractor must be fully qualified under any state or local licensing law for Contractor's in effect at the time and at the location of the Work before submitting his bid. If the project is in the State of Louisiana, only the bids of Contractors and Subcontractors duly licensed under the Louisiana Revised Statutes 37:2151 et. seq. will be considered if licensing is required by that law. The Contractor shall be responsible for determining that all of his subcontractors or perspective subcontractors are duly licensed in accordance with the law."

"3.7.8 The requirements of Section 3.7.2, 3.7.3, and 3.7.4 do not waive the Contractor's responsibility of complying with the requirements of the Contract Documents when such requirements exceed those of any laws, codes, ordinances, rules, regulations and lawful orders of any public authority bearing on the Work."

### 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

Add the following Sections:

"3.12.11 Review of Shop Drawings, Product Data, and Samples by the Architect is to review general design concepts with the Contract Documents. The Contractor is responsible for confirming Shop Drawing, Product Data, and Sample dimensions, quantities and details, and shall compare same with actual field verified dimensions on the Project Site."

"3.12.12 The Contractor shall thoroughly review Shop drawings, Product Data and Samples prior to submitting same to the Architect. Having to resubmit Shop drawings, Product Data or Samples because of one or more rejections, or requirements to revise and resubmit, shall not constitute an acceptable reason for granting the Contractor additional Contract Time to perform the Work."

"3.12.13 After the Shop Drawings, Product Data and Samples are reviewed by the Architect, the Contractor shall again thoroughly review and approve the Shop drawings, Product Data, and Samples, in detail, prior to ordering materials and equipment to insure compliance with all of the Contract Documents, and to insure that all dimensions are verified, no errors and omissions occur, and that all materials and equipment are ordered properly for a complete, functional assembly. Costs for additional materials and equipment required to complete the Project which were not ordered by the Contractor because of his final review errors and omissions in Shop Drawings, Product Data, and Samples shall be paid for by the Contractor."

### 3.13 USE OF SITE

Add the following Section:

- "3.13.1 Subject to the Contractor's concurrence, the Owner shall have the privilege to use any and all portions of the building that have reached such a stage of completion as to permit occupancy, provided that such occupancy does not hamper the Contractor or prevent this completion of the Work. Terms of the partial occupancy shall be subject to the Contractor's approval. This shall not constitute final acceptance of any part or parts of the Work, nor shall such occupancy release the Contractor from his obligations under the Contract."

#### ARTICLE 4

#### ARCHITECT

#### 4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

*Add the following Section 4.2.2.1 to Section 4.2.2:*

- "4.2.2.1 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for site visits made necessary by the default of the Contractor or by defects or deficiencies in the Work."

#### ARTICLE 5

#### SUBCONTRACTORS

#### 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

*Delete Section 5.2.1, and add the following:*

- "5.2.1 Unless otherwise required by the Contract Documents, the Contractor shall furnish at the Pre-Construction Conference, to the Owner and the Architect, in writing, the names of the Persons or entities (including those who are to furnish materials or equipment fabricated to a special design, proposed for each of the principal portions of the Work. No Contractor payments shall be made until this information is received in detail."

*Delete Section 5.2.2 and add the following:*

- "5.2.2 The Contractor shall solely be responsible for selection and performance of all Subcontractors. The Contractor shall not be entitled to claims for additional time and/or an increase in the Contract Sum due to a problem with the performance or non-performance of a Subcontractor."

*Delete Section 5.2.3 and substitute the following:*

- "5.2.3 The Contractor shall notify the Owner through the Architect when a Subcontractor is to be changed and substituted with another Subcontractor."

#### ARTICLE 7

#### CHANGES IN THE WORK

#### 7.2 CHANGE ORDERS

*Delete Section 7.2.1 and add the following:*

- "7.2.1 A Change Order is a written order to the Contractor signed by the Owner and the Architect, issued after execution of the Contract, authorizing a change in the Work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order. A Change Order signed by the Contractor indicates his final agreement therewith, including the adjustment in the Contract Sum or the Contract Time."

Add Section 7.2.2 as follows:

"7.2.2 Before a Change Order is prepared, the Contractor shall provide and deliver to the Architect the following information, not subject to waiver, within a reasonable time after being notified to prepare said Change Order:

- .1 An itemized list of material and labor cost for each Subcontractor's and/or Sub-subcontractor's Work, including quantities and unit prices for each item of labor and each item of material.
- .2 An itemized list of material and labor cost for the General Contractor's Work, including quantities and unit prices for each item of labor and each item of material."

Add Section 7.2.3 as follows:

"7.2.3 After a Change Order has been approved, no future request for extensions/adjustments of Contract Time, Sum, or cost shall be considered for that particular Change Order."

Add Section 7.2.4 as follows:

"7.2.4 Adjustments to the Contract Sum or Cost of the Work, whether General Contractor cost or Subcontractor cost or Sub-subcontractor, shall not include any of following:

- .1 Salaries or other compensation of personnel at the principal office and branch offices, or expenses of the principal office or branch office.
- .2 Any part of any capital expenses, including interest on the capital employed for the Work.
- .3 Overhead and general expenses of any kind of the cost of any items not specifically and expressly included above in the cost of the Work.
- .4 Cost of supervision not specifically required by the Change Order.
- .5 Cost due to negligence of the Contractor, and Subcontractor, or Sub-subcontractor, anyone directly or indirectly employed by any of them, or for whose acts any of them may be liable, including but not limited to, the correction of defective or non-conforming Work, disposal of materials and equipment wrongly supplied, making good any damage to property, or delays caused by failure to provide adequate Change Order documentation.
- .6 Cost not substantiated by detailed quantities, unit prices indicating labor, material, and equipment, and overhead and profit."

Add Section 7.2.5 as follows:

"7.2.5 The allowance for combined overhead and profit included in the total cost to the Owner shall be based on the following schedule:

1. For the Contractor, for Work performed by the Contractor's own forces, 15% of cost of the work.
2. For the Contractor, for Work performed by the Contractor's Subcontractor, 5% of the amount due to the Subcontractor.
3. For each Subcontractor or Sub-subcontractor involved, for Work performed by that Subcontractor's or Sub-subcontractor's own forces, 15%.
4. For each Subcontractor, for Work performed by the Subcontractor's Subcontractors, 5% of the amount due the

Sub-subcontractor.

5. Cost to which overhead and profit is to be applied shall be determined in accordance with Paragraph 7.3.6.
6. In order to facilitate checking of quotations for extras or credits, **all** proposals shall be accompanied by a complete itemization of costs including labor, materials and subcontracts. Labor and materials shall be itemized in the manner specified above. Where major cost items are Subcontractors cost items, they shall be itemized also."

## ARTICLE 8

### TIME

#### 8.1 DEFINITIONS

*Add the following sentence to 8.1.4:*

- 8.1.4.1 "Calendar days include Saturdays, Sundays, and all holidays."

#### 8.2 PROGRESS AND COMPLETION

*Delete Section 8.2.1 and add the following:*

- "8.2.1 Time is of the essence and completion of the Work shall be within the Contract Time for completion stated in the Agreement, subject to such extensions as may be granted under Section 8.3. The Contractor agrees to commence Work not later than 14 days after the transmittal date of a written notice to proceed from the Owner and to substantially complete the Project within the time stated in the Contract. The Owner will suffer financial loss if the Project is not substantially complete in the time set forth in the Contract Documents. The Contractor and the Contractor's surety shall be liable for and shall pay to the Owner the sum stated in the Contract Documents as fixed, agreed and liquidated damages for each consecutive calendar days (Saturdays, Sundays and holidays included) of delay until the Work is substantially complete. The Owner shall be entitled to the sum stated in the Contract Documents. Such Liquidated Damages shall be withheld by the Owner from the amounts due the Contractor for progress payment and/or retainage payments. If there is no written notice to proceed by the Owner, it shall be the date of the Agreement or such date as may be established therein."

*Add Section 8.2.4 as follows:*

- "8.2.4 If the Work is delayed for causes attributable to the Contractor or Sub-Contractor, the Contractor shall provide increased Work forces and overtime Work forces, (including weekdays and holidays), at no additional cost to the Owner until the Project is Substantially Completed."

#### 8.3 DELAYS AND EXTENSIONS OF TIME

*At the end of Section 8.3.1, after the word "may", delete the word, "determine" and add the following at the end of paragraph:*

"subject to Owner's approval of Change Order. If the claim is not made within the limits of Article 15 all right for claims for that month are waived."

*Add the following Sections 8.3.4, 8.3.5, 8.3.6, and 8.3.7:*

- "8.3.4 All requests for extensions in time for a particular month shall be delivered to the Architect for review not later than the second Tuesday of the following month. The Owner or the Architect may reject any requests for extension of Contract Time received untimely (after the second Tuesday of the following month as specified above) based solely on the fact that the requests were untimely."

- "8.3.5 Contractor may submit a schedule that encompasses less time than the contract time. Such accelerated schedules, however, shall impose no accelerated requirements upon the Owner or Architect. The Contractor shall not be entitled to additional costs or time deemed necessary by him to meet the accelerated schedule."
- "8.3.6 No payment or compensation for damages of any kind will be made by the Owner to the Contractor as a result of any hindrance or delay in the progress of the Work, if the hindrance or delay is partially or wholly attributable to the Contractor."
- "8.3.7 If at any time the Work lags, sufficient increased Work forces and overtime hours, including weekends shall be provided by the Contractor to maintain the schedule to insure that the Project is completed in accordance with the time set forth by the Contract Documents. Said overtime and costs of additional Work forces shall be paid for by the Contractor."

## ARTICLE 9

### PAYMENTS AND COMPLETION

#### **9.2 SCHEDULE OF VALUES**

*Delete Section 9.2.1 and add the following:*

- "9.2.1 Prior to start of construction, the Contractor shall submit to the Architect and the Owner a Schedule of Values allocated to the various portions of the Work, providing a detailed breakdown of the Contract Sum. The Contractor shall also submit such data to support and substantiate the accuracy of the schedule as the Architect and the Owner may require. The contents of the Project Manual shall be used as a basis for format for listing costs of Work."

*Add the Section 9.2.3:*

- "9.2.3 The schedule of values shall be submitted on AIA Documents G 703-1992, Continuation Sheet, submitted in detail:
1. Use the index of the Project Manual to list the Description of Work required under Column B of G703. List costs of Work for each Section of the Specifications for Division 1 through 16.
  2. Under the General Conditions and Division 1, costs of Work of General Conditions, Supplementary Conditions, Temporary Requirements, and Cleaning shall be listed separately with separate costs indicated for Insurance, Bonds, Temporary Requirements, and Cleaning, listed separately thereafter, and shall be paid for monthly, spread out during the entire period of the Contract. Large sums requested by the Contractor in an early part of the Contract, for items listed in this Paragraph, shall be submitted with invoices, marked paid, showing that these bills have been paid. Up front, unidentified cost of Work shall not be arbitrarily lumped under the General Conditions and Division 1.
  3. Round off cost figures of each heading to the nearest dollar. The total of all items shall equal the total Contract Sum.
  4. This schedule, when approved by the Architect, shall be used as a basis for the Contractor's Applications for Payment."

#### **9.3 APPLICATION FOR PAYMENT**

*Add the following Sections to 9.3.1:*

- "9.3.1.3 Payments will be made by the Owner from time to time during the progress of the Work, but no more frequently than once every 30 days."
- "9.3.1.4 Payments shall fall due 15 days after the Contractor submits an Application for Payment."

- "9.3.1.5 The form of Application for Payment shall be AIA Document G 702, 1992, supported by AIA Document G 703, 1992, Continuation Sheet. The Contractor shall submit, in triplicate, with one original, and two (2) copies, Application for Payment on or about the first of each month."
- "9.3.1.6 Retainage. For Projects less than \$500,000.00, the amount of any payment shall not exceed 90% of the value of the Work completed since last payment. The sum total of all payments at any date shall not exceed 90% of the value of all Work completed to that date. For Projects of \$500,000.00 or more, this percentage will be increased to 95%, at Owner's discretion."
- "9.3.1.7 Application for Payment shall indicate the value of labor and materials incorporated in the Work and of material stored on the Project Site to date."
- "9.3.1.8 The retainage shall not be due the Contractor until the expiration of the statutory lien period and submission to the Architect of a clear lien certificate issued by the Clerk of Court in the Parish in which the Work has been performed. The retainage shall not be due the Contractor until Final Inspections have been conducted by the Architect and the Final Acceptance has been approved by the Owner and the Architect."
- "9.3.1.9 Do not submit copy machine copied black and white copies of the AIA Applications for Payment and try to get these approved as originals. After preparing each of the original "red" AIA forms, do not sign same immediately. Prior to signing same, make a minimum of 2 additional black and white copies of the original in ink. Deliver a total of 3 Applications for Payment to the Architect, i.e. one (1) "red" and two (2) black and white copies of the original, all signed with the Contractor's original signature in ink. Do not "fax" applications for payment. Applications for payment not submitted in accordance with the above instructions shall not be accepted, shall not be processed, and shall be delayed along with the delay of the Architect's inspection until correctly signed originals and correctly signed copies are submitted."

Add the following to Section 9.3.2:

"In order for the Contractor to be paid for materials stored off site, he must supply the following:

1. Invoice from the manufacturer showing itemized list and cost of items stored.
2. Certificate of Insurance specifically showing each item itemized in 1. above is specifically insured for the amount shown."

Add the following to Section 9.3.2:

- "9.3.2.1 Payment for storage of materials and equipment on or off the site shall be made to compensate to the Contractor for **value** supplied to the Owner **Value** to the Owner does not include Contractor's profit or markup on the materials and equipment, but can include delivery and unloading costs to the Contractor."

## 9.4 CERTIFICATES FOR PAYMENT

Add Section 9.4.3:

- "9.4.3 The Contractor further expressly undertakes to defend the Owner and hold it harmless, at the Contractor's sole expense including attorney's fees, against any actions, lawsuits, or proceedings brought against the Owner as a result of any claim or lien filed against the Contract funds, the Work, the site or any of the Work, the Project site, and any improvements made thereon."

## 9.7 FAILURE OF PAYMENT

Delete Section 9.7 in its entirety.

## 9.8 SUBSTANTIAL COMPLETION

*In Section 9.8.1 delete in first sentence the words, "or designated portion thereof."*

*In Section 9.8.2, delete in first sentence the words, "or a portion thereof which the Owner agrees to accept separately."*

*In Section 9.8.2, on Line 5 after "corrected", delete "prior to final payment" and add the following sentences:*

"Prior to inspection by the Architect, the Contractor shall notify the Architect that the Project is ready for inspection by the State Fire Marshal's Office. The Architect shall determine if the Project is substantially complete in accordance with Section 9.8.1."

*Add Section 9.8.2.1:*

- "9.8.2.1 Upon the recommendation of the Architect, the Owner may issue a Substantial Completion of the Building Contract which the Contractor shall record with the Clerk of Court in the Parish in which the Work has been performed. If the Substantial Completion has not been recorded 7 days after issuance, the Owner may record the acceptance at the Contractor's expense and deduct same from the Contract Sum."

*Add Section 9.8.2.2:*

- "9.8.2.2 A "punch list" of "exceptions" and the dollars value related thereto will be prepared by the Architect. A monetary value will be assigned to this list, which is to be twice the estimated actual value of the Work. Cost of these items shall be prepared in the same format as the schedule of values. None of these funds shall be due the Contractor until all "punch list" items are completed and are accepted by the Architect. If the dollar value of the "punch list" items exceeds the amount of funds, less the retainage amount, in the remaining balance of the Contract, the project shall not be accepted as substantially complete. If the remaining funds are less than that required to complete the Work, the Contractor shall pay the difference within 10 calendar days of notice thereof. If delivery of materials or equipment as part of the "punch list" Work, is beyond control of the Contractor, the Contractor's completion time shall be extended and his surety so notified. If all "punch list" items have not been completed by the end of the 30-day lien period, through no fault of the Architect or Owner, the Owner may find the Contractor in default. If the Owner finds the Contractor in default, the surety shall be notified. If within 60 days after notification, the surety has not taken reasonable steps to complete the "punch list", the Owner may at his option, contract to have the remainder of the Work completed, and pay for such Work with the unpaid funds remaining in the Contract Sum. Failure to complete the "punch list" items shall constitute a reason for disqualification of the Contractor on future projects. If the surety fails to complete the "punch list" within the stipulated time period, the Owner may not accept bonds submitted in the future, by surety."

*Add Section 9.8.2.3:*

- "9.8.2.3 A "punch list" of "exceptions" and the dollar value related there-to will be prepared by the Architect. A monetary value will be assigned to this list, which is to be twice the estimated actual value of the work. Cost of these items shall be prepared in the same format as the schedule of values. None of these funds shall be due the Contractor until all punch list items are completed and are accepted by the Architect. If the dollar value of the punch list exceeds the amount of funds, less the retainage amount in the remaining balance of the Contract, then the project shall not be accepted as substantially complete. "If funds remaining are less than that required to complete the work, the Contractor shall pay the difference."

*In Section 9.8.3 at each place it appears, delete the words "or designated portion thereof".*

*Section 9.8.4, delete the words "or designated portion thereof".*

*Add Section 9.8.5.1:*

- "9.8.5.1 Upon Substantial Completion of the Work and recommendation of the Architect, the Owner shall accept the Work in

accordance with the Certificate of Substantial Completion of the Work. The Contractor shall cause the Certificate to be recorded with the Clerk of Court of the Parish in which the Work has been done. Issuance of the Certificate of Substantial Completion does not constitute final acceptance."

## 9.10 FINAL COMPLETION AND FINAL PAYMENT

*Delete Section 9.10.1 and add the following:*

"9.10.1 Upon receipt of written notice that the work is ready for final inspection and acceptance and upon receipt of final Application for Payment, the Architect will make such inspection. Upon making the inspection, if the Architect finds any work not complete, he will furnish the Contractor with a "punch list" of any items found incomplete or not in conformance with the Contract Documents. The Contractor shall remedy such defects within thirty (30) days of his receipt of the list, and the Architect will make one subsequent inspection of the Work. Should additional inspections of the work be required due to failure of the Contractor to remedy defects listed, the Owner shall deduct the expense of any additional inspections from the Contract amount. The additional expense shall be as follows: \$95.00 per hour for the Architect's time and \$75.00 per hour for Consultant's time. Any additional expenses shall be at a rate of three (3) times the actual costs to the Architect. When the Architect finds the work acceptable under the Contract Documents and the Contract fully performed, the Architect will issue a final Certificate of Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's observations, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due to the Contractor, and noted in said final Certificate, is due and payable. The Architect's final Certificate for Payment will constitute a further representation that the conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled."

*Add Section 9.10.2.1:*

"9.10.2.1 Neither the final payment nor any part of the retained percentage shall become due until the Contractor shall deliver to the Owner a Certificate by the Clerk of Court of the Parish that the Owner's Substantial Completion Certificate has been recorded, more than 45 days has elapsed since the recordation, and no liens have been recorded affecting this property, and all affidavits, consents and releases specified in these General Conditions."

## ARTICLE 11

### INSURANCE AND BONDS

#### 11.1 CONTRACTOR'S LIABILITY INSURANCE

*Add the following Section 11.1.2.1 to 11.1.2:*

"11.1.2.1 The Contractor shall procure and maintain, during the life of this Contract, such insurance, with limits as hereinafter provided, which will cover the Contractor's, the Owner's and the Architect's legal liability arising from operations under this Contract by the Contractor and any Subcontractor, and by anyone directly or indirectly employed by either of them, for claims for damages for personal injury, including accidental death, as well as claims for property damages.

1. Worker's Compensation:
  - a. State: Statutory, in compliance with the Louisiana Workers' Compensation Law.
  - b. Employer's Liability: Require all Subcontractors to provide for their employees.
2. Comprehensive or Commercial General Liability, (including Premises-Operations; Independent Contractors' Protective; Products and Completed Operations; Broad Form Property Damage):
  - a. Bodily Injury:
    - Each Occurrence: \$1,000,000
    - Per Project Aggregate: \$2,000,000

- b. Property Damage:  
Each Occurrence: \$1,000,000
  - c. Products and Completed Operations to be maintained for one year after final payment:  
Aggregate: \$2,000,000
  - d. Broad Form Property Damage Coverage shall include Completed Operations.
3. Contractual Liability:
- a. Bodily Injury:  
Combined Single Limit: \$1,000,000
  - b. Property Damage:  
Each Occurrence: \$1,000,000
4. Personal Injury, with Employment Exclusion deleted:
- a. Aggregate: \$2,000,000
5. Business Auto Liability (including owned, non-owned and hired vehicles):
- a. Bodily Injury:  
Combined Single Limit: \$1,000,000
  - b. Property Damage:  
Each Accident: \$1,000,000
6. If the General Liability coverages are provided by a Commercial Liability policy, then:
- a. General Aggregate shall not be less than \$2,000,000 and it shall apply, in total, to this Project only.
  - b. Fire Damage Limit shall be not less than \$2,000,000 for any one fire,
  - c. Medical Expense Limit shall be not less than \$1,000,000 on any one person.
7. Umbrella Excess Liability: \$2,000,000"

Add the following sentence to Section 11.1.3:

- "11.1.3 If this insurance is written on a Commercial General Liability policy form, the certificates shall be ACORD form 25-S, completed and supplemented in accordance with AIA Document G715-1991, Instruction Sheet and Supplemental Attachment for ACORD Certificate of Insurance 25-S."

### 11.3 PROPERTY INSURANCE

- 11.3.1 *In the first sentence of Section 11.3.1, delete "Unless otherwise provided, the Owner" and substitute "The Contractor".*

Add the following sentences to Section 11.3.1:

"The form of policy for this Coverage shall be Completed Value. If the Owner is damaged by the failure of the Contractor to maintain such insurance, then the Contractor shall bear all reasonable costs properly attributable thereto."

- 11.3.1.2 Delete Section 11.3.1.2 in its entirety.
- 11.3.1.3 Delete Section 11.3.1.3 in its entirety.
- 11.3.4 Delete Section 11.3.4 in its entirety.

Delete Section 11.3.6 in its entirety and substitute the following:

"11.3.6 Before an exposure to loss may occur, the Contractor shall file with the Owner two certified copies of the policy or policies providing this Property Insurance coverage, each containing those endorsements specifically related to the Project. Each policy shall contain a provision that the policy will not be cancelled or allowed to expire until at least 30 days' prior written notice has been given to the Contractor."

11.3.7 Modify Section 11.3.7 by substituting "Contractor" for "Owner" at the end of the first sentence.

Delete the first sentence of Section 11.3.8 and substitute the following:

"11.3.8 A loss insured under this property insurance shall be adjusted by the Contractor as fiduciary and made payable to the Contractor as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10."

11.3.9 Modify Section 11.3.9 by substituting "Contractor" for "Owner" each time the latter word appears except in the last sentence.

11.3.10 Modify Section 11.3.10 by substituting "Contractor" for "Owner" each time the latter word appears.

Add the following Section 11.3.11:

11.3.11 Contractor is responsible to provide Builder's Risk insurance for the project.

## ARTICLE 12

### UNCOVERING AND CORRECTION OF WORK

"12.2.6 Substantial Completion Certificates, Final Acceptance, Final Payment and not finding or uncovering nonconforming Work before, during, or after the expiration of the one (1) year period after Substantial Completion, shall not be construed as acceptance of nonconforming Work or acceptance of Work which was not performed in accordance with the Contract Documents."

## ARTICLE 14

### TERMINATION OR SUSPENSION OF THE CONTRACT

#### 14.1 TERMINATION BY THE CONTRACTOR

Delete entire Section 14.1.1.4.

#### 14.2 TERMINATION BY THE OWNER FOR CAUSE

Add the following Section:

"14.2.1.5 Fails to complete the "punch list" within the lien period as specified in 9.8.2.3."

*In Paragraph 14.2.3, on Line 4 after the word "finished", add the following sentence:*

"Termination by the Owner shall not suspend assessment of liquidated damages against the surety."

Add the following Sections:

- "14.2.5 In case the work is not complete in every respect within the time specified in the contract, or within the time that may be extended, it is distinctly understood and agreed that deductions (Liquidated Damages) at the rate of **Two Hundred Dollars (\$200.00)** per diem shall be made from the total contract price for each and every calendar day after completion was required up to and including the date of the completion of the work and the acceptance thereby the Owner."
- "14.5.2 Contractor shall also pay the additional expense and cost of Architectural/Engineering Administration necessary for such extension and continuation of the work. Twenty-five (25%) percent of the total amount shall be added to the per diem established above. This amount shall also be withheld from the balance due Contractor and shall be paid to the Architect."
- "14.5.3 It is distinctly understood and agreed that the above sum shall be deducted as liquidated damages and not as the penalty. The said sum being specifically agreed upon in advance as the measure of damage to the Owner on account of the delay in the completion of the work. The Contractor agrees and consents that the Contract price reduced by the aggregate of the entire damages so deducted shall be accepted in full satisfaction of all work executed under the Contract."

**ADD THE FOLLOWING ARTICLE 15**

**ARTICLE 15**

**CLAIMS AND DISPUTES**

*Delete Section 15.1.5.2 and substitute the following:*

"If adverse weather conditions are the basis for a claim for additional Contract Time, the Contractor shall document that the weather conditions had an adverse effect on the progress of the Work and on the construction schedule. Document the date of each rain day for the Project Site. An increase in Contract Time due to adverse weather shall not be a cause for an increase in Contract Sum."

*Add the following:*

- "15.1.5.3 In planning the construction schedule within the agreed Contract Time, it shall be assumed that the Contractor has anticipated the amount of adverse weather conditions normal to the Project site of the Work for the season or seasons of the year involved. Only those weather days attributable to other than normal weather conditions will be considered by the Architect and Owner."
- "15.1.5.4 For this Project, the following listed number of rain days for each month, based on average, general, local climatology data, shall be considered reasonable, anticipated days of adverse rainfall on a monthly basis:  
January – 11; February – 10; March – 8; April – 7; May – 5; June – 6; July – 6; August – 5;  
September – 4; October – 3; November – 5; December – 8."
- "15.1.5.5 Normal anticipated adverse rainfall as indicated above for the area of the Project site shall not be a cause for an extension of Contract Time. The Contractor shall anticipate the number of days specified above as a minimum number of days of rain per month with additional wet adverse Work conditions following the above number of days of rainfall."
- "15.1.5.6 The Contract is based on a calendar day basis. Calendar days includes Saturdays, Sundays, and all Holidays."

**END OF SECTION 00 73 00**

## SECTION 00 73 99 - SPECIAL CONDITIONS

### PART 1 - GENERAL

#### 1.1 DOCUMENT COORDINATION

- A. The Contractor shall be responsible to review all documents prior to bidding project and it shall be his responsibility to coordinate all phases of the project with the various subcontractors and material suppliers. If there are any conflicts in the Contract Documents, he shall call it to the attention of the Architect before commencing work. If conflicts occur later in the project, the Contractor shall be responsible for correcting same without any additional cost to the Owner.

#### 1.2 TEMPORARY FIELD OFFICE, LIGHT, POWER, TOILET

- A. The Contractor shall provide and maintain a temporary field office on the site. Provide portable toilet facilities and keep clean. Provide temporary power, water and telephone service to site during entire construction period.

#### 1.3 WAGE AND LABOR REGULATIONS

- A. The Contractor shall comply with applicable provisions of labor laws and other statutes and regulations of the governments of the United States of America, the State of Louisiana, and local governments with jurisdiction over the project, and shall require each of his subcontractors, to also comply.

#### 1.4 TAXES

- A. All Federal, State, or Local taxes due or payable during the time of contract on materials or labor in connection with this work shall be paid for by the Contractor to proper authorities.

#### 1.5 TEMPORARY SCAFFOLDS, STAGING, AND SAFETY DEVICES

- A. Provide, erect, maintain, and remove when directed, all scaffolding, staging, platforms, temporary runways, temporary flooring, guards, railings, stairs, etc., as required by Local and State Codes, or laws, for the protection of workmen and the public. The construction, inspection and maintenance of the above items shall comply with all safety codes and regulations as applicable to the project. This shall also include temporary dust partitions as required to suit job conditions.

#### 1.6 PERMITS

- A. The building permit and State Fire Marshal architectural review will be applied for by the Architect during the bid period. Therefore do not include any money in bid for building permit or State Fire Marshal architectural review. Contractor shall be responsible for all other permits, fees, and charges.

#### 1.7 PRIOR APPROVALS

- A. Subcontractors and material suppliers desiring to bid on products that are not specified must contact Architect or Engineer requesting prior approval, in accordance with Section 00 26 00 "Procurement and Substitution Procedures."
- B. The Architect may issue a written approval within 72 hours of the bid date or he may give a verbal approval and follow up same with written approval shortly thereafter. Under no circumstances will the Architect entertain any substitution of materials after the bid date without prior approval.

#### 1.8 AS-BUILT DRAWINGS

- A. The Contractor shall keep a complete record of all field changes and submit a marked-up record set of these changes to Architect at conclusion of job.

## 1.9 PERFORMANCE AND PAYMENT BONDS

- A. The Contractor shall furnish and pay for a Performance Bond and a Payment Bond written by a company licensed to do business in the State of Louisiana, which shall be signed by the Surety's agent or attorney-in-fact, each in an amount equal to 100% of the Contract amount. The Bonds shall be in favor of the Owner.

## 1.10 PAYMENTS AND RETAINAGE

- A. Payments to the Contractor shall be made by Owner upon satisfactory approval by the Architect in direct proportion to work completed.
- B. The Owner and Contractor mutually agree that a minimum of ten (10%) percent of the total contract price shall be retained by the Owner, and that the retainage shall be due and payable to the Contractor upon the occurrence of the expiration of applicable lien period plus receipt by the Owner of evidence that no contractors, subcontractors, material suppliers, or other such liens are recorded.
- C. The Contractor as a further condition precedent to payment of the ten (10%) percent retainage must also provide the Owner with a bills paid affidavit, certifying that all labor and material used on the project have been paid or otherwise satisfied.

## 1.12 SUBMISSION OF POST-BID INFORMATION

- A. Upon request by the Architect, the selected Bidder shall within ten days thereafter submit the following:
1. A statement of costs for each major item of Work included in the bid.
  2. A construction schedule with phasing of work on each floor.
  3. A designation of the Work to be performed by the bidder with his own forces.
  4. A list of names of the Subcontractors or other persons or organizations (including those who are to furnish materials or equipment fabricated to a special design) proposed for such portions of the work as may be designated in the bidding documents or, if no portions are so designated, the names of the Subcontractors proposed for the principal portions of the work. The Bidder will be required to establish to the satisfaction of the Architect and the Owner the reliability and responsibility of the proposed Subcontractors to furnish and perform the work described in the specification pertaining to such proposed Subcontractors respective trades.

## 1.13 APPLICATION AND CERTIFICATE FOR PAYMENT

- A. Payments are to be submitted monthly on AIA Document G702 and G703, (2 Pages), Application and Certificate for Payment. These forms may be obtained from the New Orleans Chapter of the American Institute of Architects, 1000 St. Charles Ave.; New Orleans, LA 70130; 504.525.8320. An original and three (3) copies must be submitted with all requests for payment.

## 1.14 ALLOWANCES – SEE SECTION 01 21 00 “ALLOWANCES”

## 1.15 FINAL COMPLETION AND FINAL PAYMENT

- A. Upon receipt of written notice from Contractor that the work is ready for final inspection and acceptance and upon receipt of his semi-final Application for Payment, the Architect will promptly make such inspection. Upon making the inspection, if the Architect finds any work not complete, he will furnish the Contractor with a "punch list" of any items found incomplete or not in conformance with the contract document. The Contractor shall remedy such defects within thirty (30) days of his receipt of the list, and the Architect will make one subsequent inspection of the work. Should additional inspections of the work be required due to failure of the Contractor to remedy defects listed, the Owner will deduct the expense of any additional inspections from the contract amount. The additional expense will be based on \$95.00/hour for the Architect and his consultants. When the Architect finds the work acceptable under the contract documents and the contract fully performed, the Architect will promptly issue a final Certificate of Payment stating that to the best of the Architect's

knowledge, information and belief, and on the basis of the Architect's observations, the work has been completed in accordance with the terms and conditions of the Contract Documents and the entire balance found to be due to the Contractor, and noted in said final Certificate, is due and payable. The Architect's final Certificate for Payment will constitute a further representation that the conditions listed in Subparagraph 9.10.2 of the General Conditions as precedent to the Contractor's being entitled to final payment have been fulfilled.

**END OF SECTION 00 73 99**



## SECTION 01 10 00 - SUMMARY

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Project information.
  - 2. Work covered by Contract Documents.
  - 3. Work by Owner, including monumental sign.
  - 4. Owner-furnished products, including residential appliances.
  - 5. Access to site.
  - 6. Work restrictions.
  - 7. Specification and drawing conventions.
  - 8. Miscellaneous provisions.
- B. Related Requirements:
  - 1. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

#### 1.3 PROJECT INFORMATION

- A. Project Identification: Algiers Pediatric Office – Dr. Cresswell.
  - 1. Project Location: 3500 Kabel Drive; New Orleans, LA 70131.
- B. Owner: Dr. Angelle Cresswell; 8 Annandale Ct.; New Orleans, LA 70131.
- C. Architect: VergesRome Architects; 320 N. Carrollton Ave., Suite 100; New Orleans, LA 70119.
  - 1. Architect's Representative: Stephanie Calamari.
- D. Architect's Consultants: The Architect has retained design professionals who have prepared designated portions of the Contract Documents.
  - 1. Civil and Structural Engineer: Robert A. Bouchon, Consulting Engineer, LLC; 1050 Jefferson Davis Pkwy., #314; New Orleans, LA 70119; t: 504.304.2312.
  - 2. Mechanical Engineer: Professional Engineering Services; 15 Cypress Point Lane; New Orleans, LA 70131; t: 504.866.2600.
  - 3. Electrical Engineer: Drake Engineering; 2738 Lapalco Boulevard.; Harvey, LA 70058; t: 504.368.1575.

#### 1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
  - 1. Demolition of existing one-story commercial building and foundation. Construct an approximate 1,800 square foot one-story pediatric office building; including raised concrete foundation system with pilings; wood framing; stone veneer and fiber-cement siding; TPO roofing; interior partitions with wood studs and gypsum board; floor and wall finishes; accessories, HVAC, plumbing, electrical, lighting, and communications systems; paving and site work for a fully operational facility.
- B. Type of Contract:
  - 1. Project will be constructed under a single prime contract.

#### 1.5 WORK BY OWNER

- A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.
  - 1. Monumental sign will be provided under a separate contract. Subsurface electrical conduits from electrical source to the sign location shall be provided in the building contract.

#### 1.6 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

#### 1.7 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
  - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Work governed by local authorities having jurisdiction.
- C. Existing Utility Interruptions: Do not interrupt utilities serving others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
  - 1. Notify affected owners not less than 48 hours in advance of proposed utility interruptions.
- D. Nonsmoking Building: Smoking is not permitted within the new building or within 25 feet (8 m) of entrances, operable windows, or outdoor-air intakes.
- E. Controlled Substances: Use of controlled substances other than tobacco is not permitted on construction site.

#### 1.8 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.
  3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION (Not Used)**

**END OF SECTION 01 10 00**



## SECTION 01 21 00 - ALLOWANCES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
  - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
  - 1. Lump-sum allowances.
  - 2. Testing and inspecting allowances.
- C. Related Requirements:
  - 1. Section 01 40 00 "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.

#### 1.3 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

#### 1.4 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

## 1.6 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

## 1.7 LUMP-SUM ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include material only.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

## 1.8 TESTING AND INSPECTING ALLOWANCES

- A. Testing and inspecting allowances include the cost of engaging testing agencies, actual tests and inspections, and reporting results.
- B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure. The cost for incidental labor to assist the testing agency shall be included in the Contract Sum.
- C. Costs of services not required by the Contract Documents are not included in the allowance.
- D. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to Owner by Change Order.

## 1.9 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
  - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
  - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
  - 3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
  - 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
  - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.

2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

### **3.2 PREPARATION**

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

### **3.3 SCHEDULE OF ALLOWANCES**

- A. Allowance No. 1: Include in the Base Bid, the lump sum allowance of \$10,000.00 to furnish testing lab services as indicated in Section 01 40 00 "Quality Requirements" and other sections of the specifications.
- B. Allowance No. 2: Include in the Base Bid, the lump sum allowance of \$20,000.00 to furnish finished hardware (materials only) as indicated in Section 08 71 00 "Door Hardware." (Shipping, taxes, and labor for the installation of hardware shall be included in the Contract Sum, not in the allowance).
- C. Allowance No. 3: Include in the Base Bid, the lump sum of \$25,000.00 to furnish and install landscaping for the property, in compliance with zoning regulations. Maintenance of landscaping for 3 months after Substantial Completion shall be included in the base bid, separate from this allowance.

**END OF SECTION 01 21 00**



## SECTION 01 25 00 - SUBSTITUTION PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
  - 1. Section 01 21 00 "Allowances" for products selected under an allowance.
  - 2. Section 01 60 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

#### 1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

#### 1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Substitution Request Form: Use CSI Form 13.1A.
  - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
    - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
    - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
    - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

- e. Samples, where applicable or requested.
  - f. Certificates and qualification data, where applicable or requested.
  - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
  - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
  - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
  - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
  - k. Cost information, including a proposal of change, if any, in the Contract Sum.
  - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
  - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
  - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

## 1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

## 1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

## PART 2 - PRODUCTS

### 2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
  - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - b. Requested substitution provides sustainable design characteristics that specified product provided.

- c. Substitution request is fully documented and properly submitted.
- d. Requested substitution will not adversely affect Contractor's construction schedule.
- e. Requested substitution has received necessary approvals of authorities having jurisdiction.
- f. Requested substitution is compatible with other portions of the Work.
- g. Requested substitution has been coordinated with other portions of the Work.
- h. Requested substitution provides specified warranty.
- i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed.

### **PART 3 - EXECUTION (Not Used)**

**END OF SECTION 01 25 00**



## SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
  - 1. Section 01 25 00 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

#### 1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

#### 1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
    - e. Quotation Form: Use forms acceptable to Architect.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Architect.

#### **1.5 ADMINISTRATIVE CHANGE ORDERS**

- A. Allowance Adjustment: See Section 01 21 00 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

#### **1.6 CHANGE ORDER PROCEDURES**

- A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

#### **1.7 CONSTRUCTION CHANGE DIRECTIVE**

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
  1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
  1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

#### **PART 2 - PRODUCTS (Not Used)**

#### **PART 3 - EXECUTION (Not Used)**

**END OF SECTION 01 26 00**

## SECTION 01 29 00 - PAYMENT PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
  - 1. Section 01 21 00 "Allowances" for procedural requirements governing the handling and processing of allowances.
  - 2. Section 01 26 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
  - 3. Section 01 32 00 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

#### 1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

#### 1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
  - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with continuation sheets.
    - b. Submittal schedule.
    - c. Items required to be indicated as separate activities in Contractor's construction schedule.
  - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
  - 1. Identification: Include the following Project identification on the schedule of values:
    - a. Project name and location.

- b. Name of Architect.
  - c. Architect's project number.
  - d. Contractor's name and address.
  - e. Date of submittal.
2. Arrange schedule of values consistent with format of AIA Document G703.
  3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
    - a. Related Specification Section or Division.
    - b. Description of the Work.
    - c. Name of subcontractor.
    - d. Name of manufacturer or fabricator.
    - e. Name of supplier.
    - f. Change Orders (numbers) that affect value.
    - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
      - 1) Labor.
      - 2) Materials.
      - 3) Equipment.
  4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
  5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
  6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
    - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
  7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
  8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
  9. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
    - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
  10. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

## 1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
  1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

- B. Payment Application Times: Submit Application for Payment to Architect by the fifth day of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
  2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
  3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored on site, but not yet installed.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
  2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
  3. Provide summary documentation for stored materials indicating the following:
    - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  2. When an application shows completion of an item, submit conditional final or full waivers.
  3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
  5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
  2. Schedule of values.
  3. Contractor's construction schedule (preliminary if not final).
  4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
  5. Products list (preliminary if not final).
  6. Submittal schedule (preliminary if not final).
  7. List of Contractor's staff assignments.
  8. List of Contractor's principal consultants.
  9. Copies of building permits.
  10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  11. Initial progress report.
  12. Report of preconstruction conference.
  13. Certificates of insurance and insurance policies.
  14. Performance and payment bonds.
  15. Data needed to acquire Owner's insurance.
- I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
  2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
  2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  3. Updated final statement, accounting for final changes to the Contract Sum.
  4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
  5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
  6. AIA Document G707, "Consent of Surety to Final Payment."
  7. Evidence that claims have been settled.
  8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
  9. Final liquidated damages settlement statement.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

## SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. General coordination procedures.
  - 2. Coordination drawings.
  - 3. Requests for Information (RFIs).
  - 4. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
  - 1. Section 01 32 00 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
  - 2. Section 01 73 00 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
  - 3. Section 01 77 00 "Closeout Procedures" for coordinating closeout of the Contract.

#### 1.3 DEFINITIONS

- A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
  - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
  - 2. Number and title of related Specification Section(s) covered by subcontract.
  - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 7 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and

e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

## 1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
  3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
  3. Make adequate provisions to accommodate items scheduled for later installation.
- C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
  2. Preparation of the schedule of values.
  3. Installation and removal of temporary facilities and controls.
  4. Delivery and processing of submittals.
  5. Progress meetings.
  6. Preinstallation conferences.
  7. Project closeout activities.
  8. Startup and adjustment of systems.
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

## 1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
    - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
    - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
    - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
    - f. Indicate required installation sequences.
    - g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
  2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
  3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
  4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
  5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
  6. Mechanical and Plumbing Work: Show the following:
    - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
  7. Electrical Work: Show the following:
    - a. Runs of vertical and horizontal conduit 32 mm (1-1/4 inches) in diameter and larger.
    - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
    - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.

- d. Location of pull boxes and junction boxes, dimensioned from column center lines.
8. Fire-Protection System: Show the following:
  - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.
10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 01 33 00 "Submittal Procedures."

## 1.7 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
  1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
  2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
  1. Project name.
  2. Project number.
  3. Date.
  4. Name of Contractor.
  5. Name of Architect.
  6. RFI number, numbered sequentially.
  7. RFI subject.
  8. Specification Section number and title and related paragraphs, as appropriate.
  9. Drawing number and detail references, as appropriate.
  10. Field dimensions and conditions, as appropriate.
  11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  12. Contractor's signature.
  13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: AIA Document G716.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
  1. The following Contractor-generated RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.

- c. Requests for approval of Contractor's means and methods.
    - d. Requests for coordination information already indicated in the Contract Documents.
    - e. Requests for adjustments in the Contract Time or the Contract Sum.
    - f. Requests for interpretation of Architect's actions on submittals.
    - g. Incomplete RFIs or inaccurately prepared RFIs.
  2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
  3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 26 00 "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:
  1. Project name.
  2. Name and address of Contractor.
  3. Name and address of Architect.
  4. RFI number including RFIs that were returned without action or withdrawn.
  5. RFI description.
  6. Date the RFI was submitted.
  7. Date Architect's response was received.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within 7 days if Contractor disagrees with response.
  1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
  2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

## 1.8 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
  1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
  2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
  1. Conduct the conference to review responsibilities and personnel assignments.
  2. Attendees: Authorized representatives of Owner Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Discuss items of significance that could affect progress, including the following:

- a. Tentative construction schedule.
  - b. Phasing.
  - c. Critical work sequencing and long-lead items.
  - d. Designation of key personnel and their duties.
  - e. Lines of communications.
  - f. Procedures for processing field decisions and Change Orders.
  - g. Procedures for RFIs.
  - h. Procedures for testing and inspecting.
  - i. Procedures for processing Applications for Payment.
  - j. Distribution of the Contract Documents.
  - k. Submittal procedures.
  - l. Preparation of record documents.
  - m. Use of the premises.
  - n. Work restrictions.
  - o. Working hours.
  - p. Owner's occupancy requirements.
  - q. Responsibility for temporary facilities and controls.
  - r. Procedures for moisture and mold control.
  - s. Procedures for disruptions and shutdowns.
  - t. Construction waste management and recycling.
  - u. Parking availability.
  - v. Office, work, and storage areas.
  - w. Equipment deliveries and priorities.
  - x. First aid.
  - y. Security.
  - z. Progress cleaning.
4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
  2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related RFIs.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Review of mockups.
    - i. Possible conflicts.
    - j. Compatibility requirements.
    - k. Time schedules.
    - l. Weather limitations.
    - m. Manufacturer's written instructions.
    - n. Warranty requirements.
    - o. Compatibility of materials.
    - p. Acceptability of substrates.
    - q. Temporary facilities and controls.
    - r. Space and access limitations.

- s. Regulations of authorities having jurisdiction.
  - t. Testing and inspecting requirements.
  - u. Installation procedures.
  - v. Coordination with other work.
  - w. Required performance results.
  - x. Protection of adjacent work.
  - y. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
  4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
  5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at weekly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
  2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
      - 1) Review schedule for next period.
    - b. Review present and future needs of each entity present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Resolution of BIM component conflicts.
      - 4) Status of submittals.
      - 5) Deliveries.
      - 6) Off-site fabrication.
      - 7) Access.
      - 8) Site utilization.
      - 9) Temporary facilities and controls.
      - 10) Progress cleaning.
      - 11) Quality and work standards.
      - 12) Status of correction of deficient items.
      - 13) Field observations.
      - 14) Status of RFIs.
      - 15) Status of proposal requests.
      - 16) Pending changes.
      - 17) Status of Change Orders.
      - 18) Pending claims and disputes.
      - 19) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
  - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- E. Coordination Meetings: Conduct Project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
  1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    - b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
    - c. Review present and future needs of each contractor present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Resolution of BIM component conflicts.
      - 4) Status of submittals.
      - 5) Deliveries.
      - 6) Off-site fabrication.
      - 7) Access.
      - 8) Site utilization.
      - 9) Temporary facilities and controls.
      - 10) Work hours.
      - 11) Hazards and risks.
      - 12) Progress cleaning.
      - 13) Quality and work standards.
      - 14) Change Orders.
  3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

**PART 2 - PRODUCTS (Not Used)****PART 3 - EXECUTION (Not Used)****END OF SECTION 01 31 00**

## SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Contractor's construction schedule.
  - 2. Construction schedule updating reports.
  - 3. Daily construction reports.
  - 4. Site condition reports.
  - 5. Special reports.
- B. Related Requirements:
  - 1. Section 01 33 00 "Submittal Procedures" for submitting schedules and reports.
  - 2. Section 01 40 00 "Quality Requirements" for submitting a schedule of tests and inspections.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
  - 1. Two paper copies.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- C. Construction Schedule Updating Reports: Submit with Applications for Payment.
- D. Daily Construction Reports: Submit at weekly intervals.
- E. Site Condition Reports: Submit at time of discovery of differing conditions.
- F. Special Reports: Submit at time of unusual event.

#### 1.4 COORDINATION

- A. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.
  - 1. Secure time commitments for performing critical elements of the Work from entities involved.

2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

## PART 2 - PRODUCTS

### 2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion.
  1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each separate area as a separate numbered activity for each main element of the Work. Comply with the following:
  1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
  2. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
  3. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
  4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
  5. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
  1. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
  2. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Partial occupancy before Substantial Completion.
    - b. Use of premises restrictions.
    - c. Seasonal variations.
    - d. Environmental control.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
  1. Unresolved issues.
  2. Unanswered Requests for Information.
  3. Rejected or unreturned submittals.
  4. Notations on returned submittals.
  5. Pending modifications affecting the Work and Contract Time.
- F. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

## 2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within 14 days of date established for the Notice to Proceed. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
  - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

## 2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
  - 1. List of subcontractors at Project site.
  - 2. List of separate contractors at Project site.
  - 3. Approximate count of personnel at Project site.
  - 4. Equipment at Project site.
  - 5. Material deliveries.
  - 6. High and low temperatures and general weather conditions, including presence of rain or snow.
  - 7. Accidents.
  - 8. Meetings and significant decisions.
  - 9. Unusual events (see special reports).
  - 10. Stoppages, delays, shortages, and losses.
  - 11. Meter readings and similar recordings.
  - 12. Emergency procedures.
  - 13. Orders and requests of authorities having jurisdiction.
  - 14. Change Orders received and implemented.
  - 15. Construction Change Directives received and implemented.
  - 16. Services connected and disconnected.
  - 17. Equipment or system tests and startups.
  - 18. Partial completions and occupancies.
  - 19. Substantial Completions authorized.
- B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

## 2.4 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

**PART 3 - EXECUTION****3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE**

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
  2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

**END OF SECTION 01 32 00**

## SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
  - 1. Preconstruction photographs.
  - 2. Periodic construction photographs.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit image files within three days of taking photographs.
  - 1. Digital Camera: Minimum sensor resolution of 8 megapixels.
  - 2. Format: Minimum 3200 by 2400 pixels, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph, accompanied by key plan file.
  - 3. Identification: Provide the following information with each image description in file metadata tag:
    - a. Name of Project.
    - b. Name and contact information for photographer.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Date photograph was taken.
    - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
    - g. Unique sequential identifier keyed to accompanying key plan.

### PART 2 - PRODUCTS

### PART 3 - EXECUTION

#### 3.1 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
1. Date and Time: Include date and time in file name for each image.
  2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.
- C. Preconstruction Photographs: Before commencement of excavation, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
1. Take photographs to show existing conditions adjacent to property before starting the Work.
  2. Take photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
  3. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- D. Periodic Construction Photographs: Take photographs monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- E. Architect-Directed Construction Photographs: From time to time, Architect will instruct photographer about number and frequency of photographs and general directions on vantage points. Select actual vantage points and take photographs to show the status of construction and progress since last photographs were taken.
- F. Additional Photographs: Architect may request photographs in addition to periodic photographs specified.
1. In emergency situations, take additional photographs within 24 hours of request.
  2. Circumstances that could require additional photographs include, but are not limited to, the following:
    - a. Special events planned at Project site.
    - b. Immediate follow-up when on-site events result in construction damage or losses.
    - c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
    - d. Substantial Completion of a major phase or component of the Work.

**END OF SECTION 01 32 33**

## SECTION 01 33 00 - SUBMITTAL PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Requirements:
  - 1. Section 01 29 00 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
  - 2. Section 01 32 00 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
  - 3. Section 01 78 23 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
  - 4. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

#### 1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

#### 1.4 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
  - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
  - 2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
  - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
    - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
  - 4. Format: Arrange the following information in a tabular format:

- a. Scheduled date for first submittal.
- b. Specification Section number and title.
- c. Submittal category: Action; informational.
- d. Name of subcontractor.
- e. Description of the Work covered.
- f. Scheduled date for Architect's final release or approval.
- g. Scheduled date of fabrication.
- h. Scheduled dates for purchasing.
- i. Scheduled dates for installation.
- j. Activity or event number.

## 1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
  3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
  4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  1. Initial Review: Allow 15 working days for initial review of each submittal. Submittals received by Architect after 1:00 p.m. will be considered as received the following working day. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
  2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  3. Resubmittal Review: Allow 15 days for review of each resubmittal.
  4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 working days for initial review of each submittal.
  5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 working days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
- D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.
  1. Indicate name of firm or entity that prepared each submittal on label or title block.
  2. Provide a space approximately 150 by 200 mm (6 by 8 inches) on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
  3. Include the following information for processing and recording action taken:
    - a. Project name.

- b. Date.
  - c. Name of Architect.
  - d. Name of Construction Manager.
  - e. Name of Contractor.
  - f. Name of subcontractor.
  - g. Name of supplier.
  - h. Name of manufacturer.
  - i. Submittal number or other unique identifier, including revision identifier.
    - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an numerical suffix after another decimal point (e.g., 061000.01.01).
  - j. Number and title of appropriate Specification Section.
  - k. Drawing number and detail references, as appropriate.
  - l. Location(s) where product is to be installed, as appropriate.
  - m. Other necessary identification.
4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
- a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return without review submittals received from sources other than Contractor.
- a. Transmittal Form for Paper Submittals: Provide locations on form for the following information:
    - 1) Project name.
    - 2) Date.
    - 3) Destination (To:).
    - 4) Source (From:).
    - 5) Name and address of Architect.
    - 6) Name of Construction Manager.
    - 7) Name of Contractor.
    - 8) Name of firm or entity that prepared submittal.
    - 9) Names of subcontractor, manufacturer, and supplier.
    - 10) Category and type of submittal.
    - 11) Submittal purpose and description.
    - 12) Specification Section number and title.
    - 13) Specification paragraph number or drawing designation and generic name for each of multiple items.
    - 14) Drawing number and detail references, as appropriate.
    - 15) Indication of full or partial submittal.
    - 16) Transmittal number, numbered consecutively.
    - 17) Submittal and transmittal distribution record.
    - 18) Remarks.
    - 19) Signature of transmitter.
- E. Options: Identify options requiring selection by Architect.
- F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and

deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

- G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
  - 1. Note date and content of previous submittal.
  - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  - 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

## PART 2 - PRODUCTS

### 2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
  - 1. Action Submittals: Submit three paper copies of each submittal unless otherwise indicated. Architect will return two copies.
  - 2. Informational Submittals: Submit two paper copies of each submittal unless otherwise indicated. Architect will not return copies.
  - 3. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
  - 1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
  - 2. Mark each copy of each submittal to show which products and options are applicable.
  - 3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's product specifications.
    - c. Standard color charts.
    - d. Statement of compliance with specified referenced standards.
    - e. Testing by recognized testing agency.
    - f. Application of testing agency labels and seals.
    - g. Notation of coordination requirements.
    - h. Availability and delivery time information.
  - 4. For equipment, include the following in addition to the above, as applicable:
    - a. Wiring diagrams showing factory-installed wiring.
    - b. Printed performance curves.
    - c. Operational range diagrams.

- d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
  5. Submit Product Data before or concurrent with Samples.
  6. Submit Product Data in the following format:
    - a. Three paper copies of Product Data unless otherwise indicated. Architect will return two copies.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.
    - f. Relationship and attachment to adjoining construction clearly indicated.
    - g. Seal and signature of professional engineer if specified.
  2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 215 by 280 mm (8-1/2 by 11 inches), but no larger than 750 by 1067 mm (30 by 42 inches).
  3. Submit Shop Drawings in the following format:
    - a. Two opaque (bond) copies of each submittal. Architect will return one copy(ies).
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  2. Identification: Attach label on unexposed side of Samples that includes the following:
    - a. Generic description of Sample.
    - b. Product name and name of manufacturer.
    - c. Sample source.
    - d. Number and title of applicable Specification Section.
    - e. Specification paragraph number and generic name of each item.
  3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
  4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
  5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

- a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
    - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
      - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
    1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
    2. Manufacturer and product name, and model number if applicable.
    3. Number and name of room or space.
    4. Location within room or space.
    5. Submit product schedule in the following format:
      - a. Three paper copies of product schedule or list unless otherwise indicated. Architect will return two copies.
- F. Coordination Drawing Submittals: Comply with requirements specified in Section 01 31 00 "Project Management and Coordination."
  - G. Contractor's Construction Schedule: Comply with requirements specified in Section 01 32 00 "Construction Progress Documentation."
  - H. Application for Payment and Schedule of Values: Comply with requirements specified in Section 01 29 00 "Payment Procedures."
  - I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 01 40 00 "Quality Requirements."
  - J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 01 77 00 "Closeout Procedures."
  - K. Maintenance Data: Comply with requirements specified in Section 01 78 23 "Operation and Maintenance Data."
  - L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

- M. **Welding Certificates:** Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- N. **Installer Certificates:** Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- O. **Manufacturer Certificates:** Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- P. **Product Certificates:** Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- Q. **Material Certificates:** Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- R. **Material Test Reports:** Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- S. **Product Test Reports:** Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- T. **Research Reports:** Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
1. Name of evaluation organization.
  2. Date of evaluation.
  3. Time period when report is in effect.
  4. Product and manufacturers' names.
  5. Description of product.
  6. Test procedures and results.
  7. Limitations of use.
- U. **Preconstruction Test Reports:** Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- V. **Compatibility Test Reports:** Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- W. **Field Test Reports:** Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- X. **Design Data:** Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

## 2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
  - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

## PART 3 - EXECUTION

### 3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Section 01 77 00 "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

### 3.2 ARCHITECT'S ACTION

- A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION 01 33 00

## SECTION 01 40 00 - QUALITY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
  - 4. Specific test and inspection requirements are not specified in this Section.
- C. Owner will pay for independent testing laboratory services for items indicated in other sections, including pile inspections, pile driving, fill compaction, concrete testing, welding observations, and special inspections. These services will be paid for under the Testing Allowance indicated in Section 01 21 00 "Allowances." Contractor shall be responsible for retesting of any failed tests and reinspections for any unprepared or failed inspections.

#### 1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
  - 1. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.

- D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- E. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- I. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

#### 1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
  - 1. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.
- B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
  - 1. Specification Section number and title.
  - 2. Entity responsible for performing tests and inspections.

3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

## 1.6 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
  1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
  2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
- B. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- C. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

## 1.7 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
  1. Date of issue.
  2. Project title and number.
  3. Name, address, and telephone number of testing agency.
  4. Dates and locations of samples and tests or inspections.
  5. Names of individuals making tests and inspections.
  6. Description of the Work and test and inspection method.
  7. Identification of product and Specification Section.
  8. Complete test or inspection data.
  9. Test and inspection results and an interpretation of test results.
  10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  12. Name and signature of laboratory inspector.
  13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
  1. Name, address, and telephone number of technical representative making report.
  2. Statement on condition of substrates and their acceptability for installation of product.

3. Statement that products at Project site comply with requirements.
  4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  6. Statement whether conditions, products, and installation will affect warranty.
  7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
  2. Statement that equipment complies with requirements.
  3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  4. Statement whether conditions, products, and installation will affect warranty.
  5. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

## 1.8 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
  2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
  3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
  4. Demonstrate the proposed range of aesthetic effects and workmanship.
  5. Obtain Architect's and Construction Manager's approval of mockups before starting work, fabrication, or construction.
    - a. Allow seven days for initial review and each re-review of each mockup.
  6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  7. Demolish and remove mockups when directed unless otherwise indicated.
- K. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.

## 1.9 QUALITY CONTROL

- A. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
  3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
  4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

- B. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."
- C. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
  3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
  6. Do not perform any duties of Contractor.
- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
  2. Incidental labor and facilities necessary to facilitate tests and inspections.
  3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  4. Facilities for storage and field curing of test samples.
  5. Delivery of samples to testing agencies.
  6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

### 1.10 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
  2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
  4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
  5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
  6. Retesting and reinspecting corrected work.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
  2. Description of the Work tested or inspected.
  3. Date test or inspection results were transmitted to Architect.
  4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

### 3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00



## SECTION 01 41 00 – SPECIAL INSPECTIONS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

#### 1.2 SELECTION AND PAYMENT:

- A. The Owner shall select and shall pay for the services of an independent testing laboratory to perform inspections and tests of materials and constructions as hereinafter specified and/or as specified in other sections of the specifications or as shown on the Drawings.

#### 1.3 RELATED SECTIONS

- A. 03 30 00 – Cast-In-Place Concrete
- B. 05 12 00 – Structural Steel
- C. 06 10 00 – Rough Carpentry
- D. 31 50 00 – Structural Excavation and Backfill
- E. 31 62 00 – Driven Piles
- F. 32 13 13 – Concrete Paving

#### 1.4 RESPONSIBILITY OF CONTRACTOR

- A. Selection of the laboratory by the Owner in no way relieves the Contractor of his responsibility to furnish materials and construction in full compliance with the project plans and specifications. The Contractor accepts all processes, materials and their use which are approved by the testing laboratory unless the Contractor protests in writing prior to the approval by the testing laboratory.

#### 1.5 COOPERATION OF CONTRACTOR

- A. The Contractor shall cooperate with the laboratory and make available, without cost, samples of materials to be tested.
- B. Furnish such nominal labor and sheltered working space as is necessary to obtain samples at the project.
- C. Advise the laboratory of the identity of material sources and instruct the suppliers to allow tests or inspections by the laboratory.
- D. Notify the laboratory sufficiently in advance of operations to allow for completion of initial tests and assignment of inspection personnel. Notification shall be not less than 48 hours in advance or as directed by the Architect.

#### 1.6 REJECTION OF MATERIALS

- A. The laboratory shall reject any materials which are not in full conformance with specifications, and promptly notify the Architect. The Architect shall notify the Contractor promptly of such rejections. Any materials rejected by the laboratory shall not be incorporated in the work without prior written approval of the Architect.

## 1.7 TEST METHODS

- A. Tests and inspections shall be conducted in accordance with the requirements of these specifications or, if not herein specified, in accordance with latest ASTM, ACI, or other recognized authorities.

## 1.8 TEST REPORTS

- A. The laboratory shall submit written reports of each test and inspection made to the Architect, Engineer and Contractor, suppliers of tested products and to such other parties the Architect may specify.

## 1.9 ADDITIONAL TESTS

- A. The Architect reserves the right to require additional tests to those specified or upon materials not herein specified for testing. If such tests are necessary because of apparently defective materials or workmanship, the cost of these additional tests shall be borne by the Contractor.

## 1.10 DESCRIPTION OF TESTS AND INSPECTION

- A. Concrete: The laboratory shall continuously monitor the delivery and placing of ready-mix concrete for compliance with the Drawings and the Specifications. The laboratory representative shall report any substandard concrete operations as soon as practicable. Laboratory shall comply with the requirements of ACI 301, Chapter 16.
  - 1. Mix Design: In advance of concrete operations, materials proposed for use in concrete shall be sampled and tested to determine their compliance with the Specifications. Mix proportions shall be established by the Contractor for each strength and type of concrete and shall submit same to Laboratory. Laboratory shall review mix designs for compliance with the Specifications.
  - 2. Concrete Plant Inspections: At all times during concrete operations, a representative of the laboratory at the batching plant shall witness the loading of each batch of concrete to determine that the approved mix designs are used
  - 3. Sampling: The laboratory shall test the slump, air content, and temperature of the discharged concrete periodically from trucks selected at random and from all truckloads exhibiting visible inconsistencies. The laboratory representative shall have the authority to reject any truckload of concrete not delivered within the specified time limit, or not in compliance with the slump or air-entrainment requirements, or otherwise judged to be deficient.
  - 4. Test cylinders: The laboratory shall cast a set of three (3) standard cylinders for each one hundred (100) cubic yards of concrete placed, but no less than one set per pour. The cylinders shall be broken in the laboratory to test the compressive strength; test one (1) at seven (7) days and two (2) at twenty-eight (28) days.
  - 5. Testing procedures shall be in accordance with the following:
    - a. Slump test, ASTM C143
    - b. Sampling, ASTM C172
    - c. Cylinder specimens, ASTM C31
    - d. Compression tests, ASTM C39
    - e. Criteria for acceptance, ACI 301 Chapter 17
    - f. Air content, ASTM C173 or C231
    - g. Obtaining and testing drilled cores and sawed beams of concrete, ASTM C42
    - h. Unit weight test, ASTM C138



**PART 3 - EXECUTION**

Not Used

**END OF SECTION 01 41 00**

## SECTION 01 42 00 - REFERENCES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

#### 1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

#### 1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AABC	Associated Air Balance Council www.aabc.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	(202) 624-5800
AATCC	American Association of Textile Chemists and Colorists www.aatcc.org	(919) 549-8141
ABMA	American Bearing Manufacturers Association www.americanbearings.org	(202) 367-1155
ACI	American Concrete Institute (Formerly: ACI International) www.concrete.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AEIC	Association of Edison Illuminating Companies, Inc. (The) www.aeic.org	(205) 257-2530
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000
AHAM	Association of Home Appliance Manufacturers www.aham.org	(202) 872-5955
AHRI	Air-Conditioning, Heating, and Refrigeration Institute (The) www.ahrinet.org	(703) 524-8800
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400

ANSI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
AOSA	Association of Official Seed Analysts, Inc. www.aosaseed.com	(607) 256-3313
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
APA	Architectural Precast Association www.archprecast.org	(239) 454-6989
API	American Petroleum Institute www.api.org	(202) 682-8000
ARI	Air-Conditioning & Refrigeration Institute (See AHRI)	
ARI	American Refrigeration Institute (See AHRI)	
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	(202) 207-0917
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASCE/SEI	American Society of Civil Engineers/Structural Engineering Institute (See ASCE)	
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (American Society of Mechanical Engineers) www.asme.org	(800) 843-2763 (973) 882-1170
ASSE	American Society of Safety Engineers (The) www.asse.org	(847) 699-2929
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9500

ATIS	Alliance for Telecommunications Industry Solutions www.atis.org	(202) 628-6380
AWEA	American Wind Energy Association www.awea.org	(202) 383-2500
AWI	Architectural Woodwork Institute www.awinet.org	(571) 323-3636
AWMAC	Architectural Woodwork Manufacturers Association of Canada www.awmac.com	(403) 453-7387
AWPA	American Wood Protection Association (Formerly: American Wood-Preservers' Association) www.awpa.com	(205) 733-4077
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.gobrick.com	(703) 620-0010
BICSI	BICSI, Inc. www.bicsi.org	(800) 242-7405 (813) 979-1991
BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association) www.bifma.com	(616) 285-3963
BISSC	Baking Industry Sanitation Standards Committee www.bissc.org	(866) 342-4772
BOCA	BOCA (Building Officials and Code Administrators International Inc.) (See ICC)	
BWF	Badminton World Federation (Formerly: International Badminton Federation) www.bwfbadminton.org	60 3 9283 7155
CDA	Copper Development Association www.copper.org	(800) 232-3282 (212) 251-7200
CEA	Canadian Electricity Association www.electricity.ca	(613) 230-9263
CEA	Consumer Electronics Association www.ce.org	(866) 858-1555 (703) 907-7600

CFFA	Chemical Fabrics & Film Association, Inc. www.chemicalfabricsandfilm.com	(216) 241-7333
CFSEI	Cold-Formed Steel Engineers Institute www.cfsei.org	(866) 465-4732 (202) 263-4488
CGA	Compressed Gas Association www.cganet.com	(703) 788-2700
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(404) 622-0073
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CPA	Composite Panel Association www.pbmdf.com	(703) 724-1128
CRI	Carpet and Rug Institute (The) www.carpet-rug.org	(706) 278-3176
CRRC	Cool Roof Rating Council www.coolroofs.org	(866) 465-2523 (510) 485-7175
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(800) 328-6306 (847) 517-1200
CSA	Canadian Standards Association www.csa.ca	(800) 463-6727 (416) 747-4000
CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(866) 797-4272 (416) 747-4000
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
CSSB	Cedar Shake & Shingle Bureau www.cedarbureau.org	(604) 820-7700
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute) www.cti.org	(281) 583-4087
CWC	Composite Wood Council (See CPA)	
DASMA	Door and Access Systems Manufacturers Association www.dasma.com	(216) 241-7333

DHI	Door and Hardware Institute <a href="http://www.dhi.org">www.dhi.org</a>	(703) 222-2010
ECA	Electronic Components Association <a href="http://www.ec-central.org">www.ec-central.org</a>	(703) 907-8024
ECAMA	Electronic Components Assemblies & Materials Association (See ECA)	
EIA	Electronic Industries Alliance (See TIA)	
EIMA	EIFS Industry Members Association <a href="http://www.eima.com">www.eima.com</a>	(800) 294-3462 (703) 538-1616
EJMA	Expansion Joint Manufacturers Association, Inc. <a href="http://www.ejma.org">www.ejma.org</a>	(914) 332-0040
ESD	ESD Association (Electrostatic Discharge Association) <a href="http://www.esda.org">www.esda.org</a>	(315) 339-6937
ESTA	Entertainment Services and Technology Association (See PLASA)	
EVO	Efficiency Valuation Organization <a href="http://www.evo-world.org">www.evo-world.org</a>	(415) 367-3643 44 20 88 167 857
FIBA	Fédération Internationale de Basketball (The International Basketball Federation) <a href="http://www.fiba.com">www.fiba.com</a>	41 22 545 00 00
FIVB	Fédération Internationale de Volleyball (The International Volleyball Federation) <a href="http://www.fivb.org">www.fivb.org</a>	41 21 345 35 45
FM Approvals	FM Approvals LLC <a href="http://www.fmglobal.com">www.fmglobal.com</a>	(781) 762-4300
FM Global	FM Global (Formerly: FMG - FM Global) <a href="http://www.fmglobal.com">www.fmglobal.com</a>	(401) 275-3000
FRSA	Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc. <a href="http://www.floridarroof.com">www.floridarroof.com</a>	(407) 671-3772
FSA	Fluid Sealing Association <a href="http://www.fluidsealing.com">www.fluidsealing.com</a>	(610) 971-4850
FSC	Forest Stewardship Council U.S. <a href="http://www.fscus.org">www.fscus.org</a>	(612) 353-4511
GA	Gypsum Association <a href="http://www.gypsum.org">www.gypsum.org</a>	(301) 277-8686

GANA	Glass Association of North America www.glasswebsite.com	(785) 271-0208
GS	Green Seal www.greenseal.org	(202) 872-6400
HI	Hydraulic Institute www.pumps.org	(973) 267-9700
HI/GAMA	Hydronics Institute/Gas Appliance Manufacturers Association (See AHRI)	
HMMA	Hollow Metal Manufacturers Association (See NAAMM)	
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
HPW	H. P. White Laboratory, Inc. www.hpwhite.com	(410) 838-6550
IAPSC	International Association of Professional Security Consultants www.iapsc.org	(415) 536-0288
IAS	International Approval Services (See CSA)	
ICBO	International Conference of Building Officials (See ICC)	
ICC	International Code Council www.iccsafe.org	(888) 422-7233 (202) 370-1800
ICEA	Insulated Cable Engineers Association, Inc. www.icea.net	(770) 830-0369
ICPA	International Cast Polymer Alliance www.icpa-hq.org	(703) 525-0511
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
IEC	International Electrotechnical Commission www.iec.ch	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
IES	Illuminating Engineering Society (Formerly: Illuminating Engineering Society of North America) www.ies.org	(212) 248-5000
IESNA	Illuminating Engineering Society of North America (See IES)	
IEST	Institute of Environmental Sciences and Technology	(847) 981-0100

	<a href="http://www.iest.org">www.iest.org</a>	
IGMA	Insulating Glass Manufacturers Alliance <a href="http://www.igmaonline.org">www.igmaonline.org</a>	(613) 233-1510
IGSHPA	International Ground Source Heat Pump Association <a href="http://www.igshpa.okstate.edu">www.igshpa.okstate.edu</a>	(405) 744-5175
ILI	Indiana Limestone Institute of America, Inc. <a href="http://www.iliai.com">www.iliai.com</a>	(812) 275-4426
Intertek	Intertek Group (Formerly: ETL SEMCO; Intertek Testing Service NA) <a href="http://www.intertek.com">www.intertek.com</a>	(800) 967-5352
ISA	International Society of Automation (The) (Formerly: Instrumentation, Systems, and Automation Society) <a href="http://www.isa.org">www.isa.org</a>	(919) 549-8411
ISAS	Instrumentation, Systems, and Automation Society (The) (See ISA)	
ISFA	International Surface Fabricators Association (Formerly: International Solid Surface Fabricators Association) <a href="http://www.isfanow.org">www.isfanow.org</a>	(877) 464-7732 (801) 341-7360
ISO	International Organization for Standardization <a href="http://www.iso.org">www.iso.org</a>	41 22 749 01 11
ISSFA	International Solid Surface Fabricators Association (See ISFA)	
ITU	International Telecommunication Union <a href="http://www.itu.int/home">www.itu.int/home</a>	41 22 730 51 11
KCMA	Kitchen Cabinet Manufacturers Association <a href="http://www.kcma.org">www.kcma.org</a>	(703) 264-1690
LMA	Laminating Materials Association (See CPA)	
LPI	Lightning Protection Institute <a href="http://www.lightning.org">www.lightning.org</a>	(800) 488-6864
MBMA	Metal Building Manufacturers Association <a href="http://www.mbma.com">www.mbma.com</a>	(216) 241-7333
MCA	Metal Construction Association <a href="http://www.metalconstruction.org">www.metalconstruction.org</a>	(847) 375-4718
MFMA	Maple Flooring Manufacturers Association, Inc. <a href="http://www.maplefloor.org">www.maplefloor.org</a>	(888) 480-9138
MFMA	Metal Framing Manufacturers Association, Inc. <a href="http://www.metalframingmfg.org">www.metalframingmfg.org</a>	(312) 644-6610

MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MIA	Marble Institute of America www.marble-institute.com	(440) 250-9222
MMPA	Moulding & Millwork Producers Association (Formerly: Wood Moulding & Millwork Producers Association) www.wmmpa.com	(800) 550-7889 (530) 661-9591
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937 (604) 298-7578
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.org	(703) 281-6613
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(630) 942-6591
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(800) 797-6223 (281) 228-6200
NADCA	National Air Duct Cleaners Association www.nadca.com	(202) 737-2926
NAIMA	North American Insulation Manufacturers Association www.naima.org	(703) 684-0084
NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848
NCAA	National Collegiate Athletic Association (The) www.ncaa.org	(317) 917-6222
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	InterNational Electrical Testing Association www.netaworld.org	(888) 300-6382 (269) 488-6382
NFHS	National Federation of State High School Associations www.nfhs.org	(317) 972-6900

NFPA	NFPA (National Fire Protection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
NFPA	NFPA International (See NFPA)	
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-1776
NHLA	National Hardwood Lumber Association www.nhla.com	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	National Oak Flooring Manufacturers Association (See NWFA)	
NOMMA	National Ornamental & Miscellaneous Metals Association www.nomma.org	(888) 516-8585
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSF	NSF International (National Sanitation Foundation International) www.nsf.org	(800) 673-6275 (734) 769-8010
NSPE	National Society of Professional Engineers www.nspe.org	(703) 684-2800
NSSGA	National Stone, Sand & Gravel Association www.nssga.org	(800) 342-1415 (703) 525-8788
NTMA	National Terrazzo & Mosaic Association, Inc. (The) www.ntma.com	(800) 323-9736
NWFA	National Wood Flooring Association www.nwfa.org	(800) 422-4556 (636) 519-9663
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (978) 557-0720
PLASA	PLASA (Formerly: ESTA - Entertainment Services and Technology Association) www.plasa.org	(212) 244-1505
RCSC	Research Council on Structural Connections	

	<a href="http://www.boltcouncil.org">www.boltcouncil.org</a>	
RFCI	Resilient Floor Covering Institute <a href="http://www.rfci.com">www.rfci.com</a>	(706) 882-3833
RIS	Redwood Inspection Service <a href="http://www.redwoodinspection.com">www.redwoodinspection.com</a>	(925) 935-1499
SAE	SAE International (Society of Automotive Engineers) <a href="http://www.sae.org">www.sae.org</a>	(877) 606-7323 (724) 776-4841
SBCCI	Southern Building Code Congress International, Inc. (See ICC)	
SCTE	Society of Cable Telecommunications Engineers <a href="http://www.scte.org">www.scte.org</a>	(800) 542-5040 (610) 363-6888
SDI	Steel Deck Institute <a href="http://www.sdi.org">www.sdi.org</a>	(847) 458-4647
SDI	Steel Door Institute <a href="http://www.steeldoor.org">www.steeldoor.org</a>	(440) 899-0010
SEFA	Scientific Equipment and Furniture Association <a href="http://www.sefalabs.com">www.sefalabs.com</a>	(877) 294-5424 (516) 294-5424
SEI/ASCE	Structural Engineering Institute/American Society of Civil Engineers (See ASCE)	
SIA	Security Industry Association <a href="http://www.siaonline.org">www.siaonline.org</a>	(866) 817-8888 (703) 683-2075
SJI	Steel Joist Institute <a href="http://www.steeljoist.org">www.steeljoist.org</a>	(843) 293-1995
SMA	Screen Manufacturers Association <a href="http://www.smainfo.org">www.smainfo.org</a>	(773) 636-0672
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association <a href="http://www.smacna.org">www.smacna.org</a>	(703) 803-2980
SMPTE	Society of Motion Picture and Television Engineers <a href="http://www.smpte.org">www.smpte.org</a>	(914) 761-1100
SPFA	Spray Polyurethane Foam Alliance <a href="http://www.sprayfoam.org">www.sprayfoam.org</a>	(800) 523-6154
SPIB	Southern Pine Inspection Bureau <a href="http://www.spib.org">www.spib.org</a>	(850) 434-2611
SPRI	Single Ply Roofing Industry <a href="http://www.spri.org">www.spri.org</a>	(781) 647-7026
SRCC	Solar Rating and Certification Corporation <a href="http://www.solar-rating.org">www.solar-rating.org</a>	(321) 638-1537

SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265
SWI	Steel Window Institute www.steelwindows.com	(216) 241-7333
SWPA	Submersible Wastewater Pump Association www.swpa.org	(847) 681-1868
TCA	Tilt-Up Concrete Association www.tilt-up.org	(319) 895-6911
TCNA	Tile Council of North America, Inc. (Formerly: Tile Council of America) www.tileusa.com	(864) 646-8453
TEMA	Tubular Exchanger Manufacturers Association, Inc. www.tema.org	(914) 332-0040
TIA	Telecommunications Industry Association (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance) www.tiaonline.org	(703) 907-7700
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance (See TIA)	
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700
TPI	Truss Plate Institute www.tpinst.org	(703) 683-1010
TPI	Turfgrass Producers International www.turfgrassod.org	(800) 405-8873 (847) 649-5555
TRI	Tile Roofing Institute www.tilerroofing.org	(312) 670-4177
UBC	Uniform Building Code (See ICC)	
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
USAV	USA Volleyball	(888) 786-5539

	www.usavolleyball.org	(719) 228-6800
USGBC	U.S. Green Building Council www.usgbc.org	(800) 795-1747
USITT	United States Institute for Theatre Technology, Inc. www.usitt.org	(800) 938-7488 (315) 463-6463
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651
WCMA	Window Covering Manufacturers Association www.wcmanet.org	(212) 297-2122
WDMA	Window & Door Manufacturers Association www.wdma.com	(800) 223-2301 (312) 321-6802
WI	Woodwork Institute (Formerly: WIC - Woodwork Institute of California) www.wicnet.org	(916) 372-9943
WMMPA	Wood Moulding & Millwork Producers Association (See MMPA)	
WSRCA	Western States Roofing Contractors Association www.wsrca.com	(800) 725-0333 (650) 938-5441
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

- C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

DIN	Deutsches Institut für Normung e.V. www.din.de	49 30 2601-0
IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
ICC	International Code Council www.iccsafe.org	(888) 422-7233
ICC-ES	ICC Evaluation Service, LLC www.icc-es.org	(800) 423-6587 (562) 699-0543

- D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

COE	Army Corps of Engineers <a href="http://www.usace.army.mil">www.usace.army.mil</a>	(202) 761-0011
CPSC	Consumer Product Safety Commission <a href="http://www.cpsc.gov">www.cpsc.gov</a>	(800) 638-2772 (301) 504-7923
DOC	Department of Commerce National Institute of Standards and Technology <a href="http://www.nist.gov">www.nist.gov</a>	(301) 975-4040
DOD	Department of Defense <a href="http://dodssp.daps.dla.mil">http://dodssp.daps.dla.mil</a>	(215) 697-2664
DOE	Department of Energy <a href="http://www.energy.gov">www.energy.gov</a>	(202) 586-9220
EPA	Environmental Protection Agency <a href="http://www.epa.gov">www.epa.gov</a>	(202) 272-0167
FAA	Federal Aviation Administration <a href="http://www.faa.gov">www.faa.gov</a>	(866) 835-5322
FG	Federal Government Publications <a href="http://www.gpo.gov">www.gpo.gov</a>	(202) 512-1800
GSA	General Services Administration <a href="http://www.gsa.gov">www.gsa.gov</a>	(800) 488-3111 (202) 619-8925
HUD	Department of Housing and Urban Development <a href="http://www.hud.gov">www.hud.gov</a>	(202) 708-1112
LBL	Lawrence Berkeley National Laboratory Environmental Energy Technologies Division <a href="http://eetd.lbl.gov">http://eetd.lbl.gov</a>	(510) 486-4000
OSHA	Occupational Safety & Health Administration <a href="http://www.osha.gov">www.osha.gov</a>	(800) 321-6742
SD	Department of State <a href="http://www.state.gov">www.state.gov</a>	(202) 647-4000
TRB	Transportation Research Board National Cooperative Highway Research Program <a href="http://www.trb.org">www.trb.org</a>	(202) 334-2934
USDA	Department of Agriculture Agriculture Research Service U.S. Salinity Laboratory <a href="http://www.ars.usda.gov">www.ars.usda.gov</a>	(202) 720-3656
USDA	Department of Agriculture Rural Utilities Service <a href="http://www.usda.gov">www.usda.gov</a>	(202) 720-2791
USDJ	Department of Justice Office of Justice Programs	(202) 307-0703

National Institute of Justice  
[www.ojp.usdoj.gov](http://www.ojp.usdoj.gov)

USP	U.S. Pharmacopeia <a href="http://www.usp.org">www.usp.org</a>	(800) 227-8772 (301) 881-0666
USPS	United States Postal Service <a href="http://www.usps.com">www.usps.com</a>	(202) 268-2000

- E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CFR	Code of Federal Regulations Available from Government Printing Office <a href="http://www.gpo.gov/fdsys">www.gpo.gov/fdsys</a>	(866) 512-1800 (202) 512-1800
DOD	Department of Defense Military Specifications and Standards Available from Department of Defense Single Stock Point <a href="http://dodssp.daps.dla.mil">http://dodssp.daps.dla.mil</a>	(215) 697-2664
DSCC	Defense Supply Center Columbus (See FS)	
FED-STD	Federal Standard (See FS)	
FS	Federal Specification Available from Department of Defense Single Stock Point <a href="http://dodssp.daps.dla.mil">http://dodssp.daps.dla.mil</a>  Available from Defense Standardization Program <a href="http://www.dsp.dla.mil">www.dsp.dla.mil</a>  Available from General Services Administration <a href="http://www.gsa.gov">www.gsa.gov</a>  Available from National Institute of Building Sciences/Whole Building Design Guide <a href="http://www.wbdg.org/ccb">www.wbdg.org/ccb</a>	(215) 697-2664            (800) 488-3111 (202) 619-8925  (202) 289-7800
MILSPEC	Military Specification and Standards (See DOD)	
USAB	United States Access Board <a href="http://www.access-board.gov">www.access-board.gov</a>	(800) 872-2253 (202) 272-0080
USATBCB	U.S. Architectural & Transportation Barriers Compliance Board (See USAB)	

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 01 42 00**

## SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
  - 1. Section 01 10 00 "Summary" for work restrictions and limitations on utility interruptions.

#### 1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Pay sewer-service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Pay water-service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Pay electric-power-service use charges for electricity used by all entities for construction operations.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- D. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
  - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
  - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.

- E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
1. Locations of dust-control partitions at each phase of work.
  2. HVAC system isolation schematic drawing.
  3. Location of proposed air-filtration system discharge.
  4. Waste handling procedures.
  5. Other dust-control measures.

## 1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

## 1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Portable Chain-Link Fencing: Minimum 50-mm (2-inch), 3.8-mm- (0.148-inch-) thick, galvanized-steel, chain-link fabric fencing; minimum 1.8 m (6 feet) high with galvanized-steel pipe posts; minimum 60-mm- (2-3/8-inch-) OD line posts and 73-mm- (2-7/8-inch-) OD corner and pull posts, with 42-mm- (1-5/8-inch-) OD top and bottom rails. Provide galvanized-steel bases for supporting posts.
- B. Polyethylene Sheet: Reinforced, fire-resistive sheet, 0.25-mm (10-mil) minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- C. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 914 by 1624 mm (36 by 60 inches).
- D. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

### 2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:

1. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 1.2-m- (4-foot-) square tack and marker boards.
  2. Drinking water and private toilet.
  3. Coffee machine and supplies.
  4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 20 to 22 deg C (68 to 72 deg F).
  5. Lighting fixtures capable of maintaining average illumination of 215 lx (20 fc) at desk height.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
1. Store combustible materials apart from building.

### 2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
  3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 01 77 00 "Closeout Procedures".
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
1. Locate facilities to limit site disturbance as specified in Section 01 10 00 "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

### 3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- F. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
  1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
    - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
    - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
  2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
  3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- G. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
  1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- H. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
  1. Install electric power service underground unless otherwise indicated.
- I. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
  1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- J. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel.
  1. At each telephone, post a list of important telephone numbers.
    - a. Police and fire departments.
    - b. Ambulance service.
    - c. Contractor's home office.
    - d. Contractor's emergency after-hours telephone number.
    - e. Architect's office.

- f. Engineers' offices.
  - g. Owner's office.
  - h. Principal subcontractors' field and home offices.
2. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

### 3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
  1. Provide construction for temporary offices, shops, and sheds located within construction area or within 9 m (30 feet) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
  2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
  1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
  1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
  2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 31 20 00 "Earth Moving."
  3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
  4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Section 32 12 16 "Asphalt Paving."
- D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
  1. Protect existing site improvements to remain including curbs, pavement, and utilities.
  2. Maintain access for fire-fighting equipment and access to fire hydrants.
- E. Parking: Provide temporary parking areas for construction personnel.
- F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
  1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
- G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
  1. Identification Signs: Provide Project identification signs as indicated on Drawings, and a 4'-0" x 8'-0" architect sign.
  2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

- a. Provide temporary, directional signs for construction personnel and visitors.
3. Maintain and touchup signs so they are legible at all times.
- H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 73 00 "Execution."
- I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
  1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

### 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
  1. Comply with work restrictions specified in Section 01 10 00 "Summary."
- B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
  1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
  2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
  3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
  4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- E. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.
- F. Site Enclosure Fence: Prior to commencing earthwork, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
  1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
  2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

- G. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- I. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
  - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- K. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
  - 1. Prohibit smoking in construction areas.
  - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
  - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
  - 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

### 3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
  - 1. Protect porous materials from water damage.
  - 2. Protect stored and installed material from flowing or standing water.
  - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
  - 4. Remove standing water from decks.
  - 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
  - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
  - 2. Keep interior spaces reasonably clean and protected from water damage.
  - 3. Periodically collect and remove waste containing cellulose or other organic matter.
  - 4. Discard or replace water-damaged material.
  - 5. Do not install material that is wet.
  - 6. Discard, replace, or clean stored or installed material that begins to grow mold.

7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
  2. Use permanent HVAC system to control humidity.
  3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
    - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
    - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
    - c. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

### 3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
  2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
  3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION 01 50 00

## SECTION 01 60 00 - PRODUCT REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
  - 1. Section 01 21 00 "Allowances" for products selected under an allowance.
  - 2. Section 01 25 00 "Substitution Procedures" for requests for substitutions.
  - 3. Section 01 42 00 "References" for applicable industry standards for products specified.

#### 1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

#### 1.4 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.

2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
  - a. Form of Approval: As specified in Section 01 33 00 "Submittal Procedures."
  - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 33 00 "Submittal Procedures." Show compliance with requirements.

## 1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
  1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
  2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

## 1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
  1. Store products to allow for inspection and measurement of quantity or counting of units.
  2. Store materials in a manner that will not endanger Project structure.
  3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
  4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
  5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
  6. Protect stored products from damage and liquids from freezing.
  7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

## 1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

## PART 2 - PRODUCTS

### 2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  4. Where products are accompanied by the term "as selected," Architect will make selection.
  5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
  6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  3. Products:
    - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

- b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
  - 4. Manufacturers:
    - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
    - b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
  - 5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
- 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
- 1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
  - 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
  - 3. Evidence that proposed product provides specified warranty.
  - 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
  - 5. Samples, if requested.

## PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

## SECTION 01 73 00 - EXECUTION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. Installation of the Work.
  - 4. Cutting and patching.
  - 5. Coordination of Owner-installed products.
  - 6. Progress cleaning.
  - 7. Starting and adjusting.
  - 8. Protection of installed construction.
- B. Related Requirements:
  - 1. Section 01 10 00 "Summary" for limits on use of Project site.
  - 2. Section 01 33 00 "Submittal Procedures" for submitting surveys.
  - 3. Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

#### 1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For land surveyor.
- B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- C. Cutting and Patching Plan: Submit plan describing procedures at least five days prior to the time cutting and patching will be performed. Include the following information:
  - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
  - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
  - 3. Products: List products to be used for patching and firms or entities that will perform patching work.

4. Dates: Indicate when cutting and patching will be performed.
  5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
    - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- D. Certified Surveys: Submit two copies signed by land surveyor.
- E. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

## 1.5 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
  2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
    - a. Primary operational systems and equipment.
    - b. Fire-suppression systems.
    - c. Mechanical systems piping and ducts.
    - d. Control systems.
    - e. Communication systems.
    - f. Fire-detection and -alarm systems.
    - g. Electrical wiring systems.
    - h. Operating systems of special construction.
  3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
    - a. Water, moisture, or vapor barriers.
    - b. Membranes and flashings.
    - c. Equipment supports.
    - d. Piping, ductwork, vessels, and equipment.
    - e. Noise- and vibration-control elements and systems.
  4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

- D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, and other construction affecting the Work.
  - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
  - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
  - 1. Description of the Work.
  - 2. List of detrimental conditions, including substrates.
  - 3. List of unacceptable installation tolerances.
  - 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 31 00 "Project Management and Coordination."

### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - 2. Establish limits on use of Project site.
  - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - 4. Inform installers of lines and levels to which they must comply.
  - 5. Check the location, level and plumb, of every major element as the Work progresses.
  - 6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
  - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

### 3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
  - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
  - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
  3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
  2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

### 3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
  2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
  4. Maintain minimum headroom clearance of 2440 mm (96 inches) in occupied spaces and 2300 mm (90 inches) in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
  2. Allow for building movement, including thermal expansion and contraction.

3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

### 3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 "Summary."
- F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
  5. Proceed with patching after construction operations requiring cutting are complete.
- G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
  1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.
  3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture,

and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

- a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
  4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
  5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

### 3.7 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
  1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
  2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

### 3.8 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
  1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 27 deg C (80 deg F).
  3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.
  4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  1. Remove liquid spills promptly.
  2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.9 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 01 91 13 "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

### 3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

**END OF SECTION 01 73 00**

## SECTION 01 77 00 - CLOSEOUT PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures.
  - 2. Final completion procedures.
  - 3. Warranties.
  - 4. Final cleaning.
  - 5. Repair of the Work.
- B. Related Requirements:
  - 1. Section 01 73 00 "Execution" for progress cleaning of Project site.
  - 2. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 3. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
  - 4. Section 01 79 00 "Demonstration and Training" for requirements for instructing Owner's personnel.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

## 1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
  3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.
    - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
  5. Submit test/adjust/balance records.
  6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
  2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  3. Complete startup and testing of systems and equipment.
  4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training."
  6. Advise Owner of changeover in heat and other utilities.
  7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
  8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  9. Complete final cleaning requirements, including touchup painting.
  10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for final completion.

## 1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Section 01 29 00 "Payment Procedures."
  2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  4. Submit pest-control final inspection report.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

## 1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first.
  2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Page number.
  4. Submit list of incomplete items in the following format:
    - a. Three paper copies. Architect will return two copies.

## 1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
  - 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 215-by-280-mm (8-1/2-by-11-inch) paper.
  - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
  - 4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
  
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
  - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

## PART 3 - EXECUTION

### 3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
  
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - g. Sweep concrete floors broom clean in unoccupied spaces.

- h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
  - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
  - j. Remove labels that are not permanent.
  - k. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
  - l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
  - m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  - n. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
    - 1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
  - o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
  - p. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 01 50 00 "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."

### 3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
  - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
  - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
    - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
  - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
  - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 77 00



## SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory.
  - 2. Emergency manuals.
  - 3. Operation manuals for systems, subsystems, and equipment.
  - 4. Product maintenance manuals.
  - 5. Systems and equipment maintenance manuals.
- B. Related Requirements:
  - 1. Section 01 33 00 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

#### 1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
  - 1. Architect will comment on whether content of operations and maintenance submittals are acceptable.
  - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:
  - 1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
    - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.

2. One paper copy. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect will return copy.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
  1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

## **PART 2 - PRODUCTS**

### **2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY**

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
  1. List of documents.
  2. List of systems.
  3. List of equipment.
  4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

### **2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS**

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  1. Title page.
  2. Table of contents.
  3. Manual contents.
- B. Title Page: Include the following information:
  1. Subject matter included in manual.

2. Name and address of Project.
  3. Name and address of Owner.
  4. Date of submittal.
  5. Name and contact information for Contractor.
  6. Name and contact information for Construction Manager.
  7. Name and contact information for Architect.
  8. Name and contact information for Commissioning Authority.
  9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
  10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
  2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 215-by-280-mm (8-1/2-by-11-inch) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
    - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
  2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
  3. Supplementary Text: Prepared on 215-by-280-mm (8-1/2-by-11-inch) white bond paper.
  4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
    - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

## 2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
1. Type of emergency.
  2. Emergency instructions.
  3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
1. Fire.
  2. Flood.
  3. Gas leak.
  4. Water leak.
  5. Power failure.
  6. Water outage.
  7. System, subsystem, or equipment failure.
  8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
1. Instructions on stopping.
  2. Shutdown instructions for each type of emergency.
  3. Operating instructions for conditions outside normal operating limits.
  4. Required sequences for electric or electronic systems.
  5. Special operating instructions and procedures.

## 2.4 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  2. Performance and design criteria if Contractor has delegated design responsibility.
  3. Operating standards.
  4. Operating procedures.
  5. Operating logs.
  6. Wiring diagrams.
  7. Control diagrams.
  8. Piped system diagrams.
  9. Precautions against improper use.
  10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
  2. Manufacturer's name.
  3. Equipment identification with serial number of each component.

4. Equipment function.
  5. Operating characteristics.
  6. Limiting conditions.
  7. Performance curves.
  8. Engineering data and tests.
  9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
  2. Equipment or system break-in procedures.
  3. Routine and normal operating instructions.
  4. Regulation and control procedures.
  5. Instructions on stopping.
  6. Normal shutdown instructions.
  7. Seasonal and weekend operating instructions.
  8. Required sequences for electric or electronic systems.
  9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

## 2.5 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
1. Product name and model number.
  2. Manufacturer's name.
  3. Color, pattern, and texture.
  4. Material and chemical composition.
  5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
  2. Types of cleaning agents to be used and methods of cleaning.
  3. List of cleaning agents and methods of cleaning detrimental to product.
  4. Schedule for routine cleaning and maintenance.
  5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

## 2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
  1. Standard maintenance instructions and bulletins.
  2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  3. Identification and nomenclature of parts and components.
  4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
  1. Test and inspection instructions.
  2. Troubleshooting guide.
  3. Precautions against improper maintenance.
  4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  5. Aligning, adjusting, and checking instructions.
  6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
  1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  1. Include procedures to follow and required notifications for warranty claims.

**PART 3 - EXECUTION****3.1 MANUAL PREPARATION**

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
  - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
  - 1. Do not use original project record documents as part of operation and maintenance manuals.
  - 2. Comply with requirements of newly prepared record Drawings in Section 01 78 39 "Project Record Documents."
- G. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

**END OF SECTION 01 78 23**



## SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.
  - 4. Miscellaneous record submittals.
- B. Related Requirements:
  - 1. Section 01 73 00 "Execution" for final property survey.
  - 2. Section 01 77 00 "Closeout Procedures" for general closeout procedures.
  - 3. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

#### 1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit one set(s) of marked-up record prints.
  - 2. Number of Copies: Submit copies of record Drawings as follows:
    - a. Initial Submittal:
      - 1) Submit one paper-copy set(s) of marked-up record prints.
      - 2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
    - b. Final Submittal:
      - 1) Submit PDF electronic files of scanned record prints and one set of prints.
      - 2) Print each drawing, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit one paper copy and annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one paper copy and annotated PDF electronic files and directories of each submittal.
  - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy and annotated PDF electronic files and directories of each submittal.

## PART 2 - PRODUCTS

### 2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an acceptable drawing technique.
    - c. Record data as soon as possible after obtaining it.
    - d. Record and check the markup before enclosing concealed installations.
    - e. Cross-reference record prints to corresponding archive photographic documentation.
  2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations below first floor.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or Construction Change Directive.
    - k. Changes made following Architect's written orders.
    - l. Details not on the original Contract Drawings.
    - m. Field records for variable and concealed conditions.
    - n. Record information on the Work that is shown only schematically.
  3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
  4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  5. Mark important additional information that was either shown schematically or omitted from original Drawings.
  6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.

2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  2. Format: Annotated PDF electronic file.
  3. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Architect.
    - e. Name of Contractor.

## 2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
  5. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Submit record Specifications as paper copy and scanned PDF electronic file(s) of marked-up paper copy of Specifications.

## 2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Format: Submit record Product Data as paper copy and scanned PDF electronic file(s) of marked-up paper copy of Product Data.
1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

## 2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as paper copy and scanned PDF electronic file(s) of marked-up miscellaneous record submittals.
  - 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

## PART 3 - EXECUTION

### 3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION 01 78 39

## SECTION 01 79 00 - DEMONSTRATION AND TRAINING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Demonstration of operation of systems, subsystems, and equipment.
  - 2. Training in operation and maintenance of systems, subsystems, and equipment.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
- B. Attendance Record: For each training module, submit list of participants and length of instruction time.

#### 1.4 QUALITY ASSURANCE

- A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 40 00 "Quality Requirements," experienced in operation and maintenance procedures and training.

#### 1.5 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

**PART 2 - PRODUCTS****2.1 INSTRUCTION PROGRAM**

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules:
  - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System, subsystem, and equipment descriptions.
    - b. Performance and design criteria if Contractor is delegated design responsibility.
    - c. Operating standards.
    - d. Regulatory requirements.
    - e. Equipment function.
    - f. Operating characteristics.
    - g. Limiting conditions.
    - h. Performance curves.
  - 2. Documentation: Review the following items in detail:
    - a. Emergency manuals.
    - b. Operations manuals.
    - c. Maintenance manuals.
    - d. Project record documents.
    - e. Identification systems.
    - f. Warranties and bonds.
    - g. Maintenance service agreements and similar continuing commitments.
  - 3. Emergencies: Include the following, as applicable:
    - a. Instructions on meaning of warnings, trouble indications, and error messages.
    - b. Instructions on stopping.
    - c. Shutdown instructions for each type of emergency.
    - d. Operating instructions for conditions outside of normal operating limits.
    - e. Sequences for electric or electronic systems.
    - f. Special operating instructions and procedures.
  - 4. Operations: Include the following, as applicable:
    - a. Startup procedures.
    - b. Equipment or system break-in procedures.
    - c. Routine and normal operating instructions.
    - d. Regulation and control procedures.
    - e. Control sequences.
    - f. Safety procedures.
    - g. Instructions on stopping.
    - h. Normal shutdown instructions.
    - i. Operating procedures for emergencies.
    - j. Operating procedures for system, subsystem, or equipment failure.
    - k. Seasonal and weekend operating instructions.
    - l. Required sequences for electric or electronic systems.
    - m. Special operating instructions and procedures.

5. Adjustments: Include the following:
  - a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
  
6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.
  
7. Maintenance: Include the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
  
8. Repairs: Include the following:
  - a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 78 23 "Operation and Maintenance Data."
  
- B. Set up instructional equipment at instruction location.

### **3.2 INSTRUCTION**

- A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  1. Owner will furnish Contractor with names and positions of participants.
  
- B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  1. Schedule training with Owner with at least seven days' advance notice.

- C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

**END OF SECTION 01 79 00**

## SECTION 02 41 16 - STRUCTURE DEMOLITION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Demolition and removal of buildings and site improvements.
  - 2. Removing below-grade construction.
  - 3. Surveying and recording existing pile locations.
  - 4. Disconnecting, capping or sealing, and removing site utilities, in preparation for new construction.
- B. Related Documents:
  - 1. Section 01 10 00 "Summary" for general scope of work.
  - 2. Section 01 32 33 "Photographic Documentation" for requirements before, during, and after demolition.

#### 1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site.

#### 1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified refrigerant recovery technician.
- B. Proposed Protection Measures: Submit informational report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection and for dust and debris control. Indicate proposed locations and construction of barriers.
  - 1. Adjacent Buildings: Detail special measures proposed to protect adjacent buildings, paving, utilities, and landscaping to remain.
- C. Schedule of Building Demolition Activities: Indicate the following:
  - 1. Detailed sequence of demolition work, with starting and ending dates for each activity.
  - 2. Temporary interruption of utility services.
  - 3. Shutoff and capping of utility services.

- D. Predemolition Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 01 32 33 "Photographic Documentation." Submit before the Work begins.
- E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

## 1.6 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.
- D. Predemolition Conference: Conduct conference at Project site.
  - 1. Inspect and discuss condition of construction to be demolished.
  - 2. Review structural load limitations of existing structures.
  - 3. Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
  - 4. Review and finalize protection requirements.
  - 5. Review procedures for dust control.
  - 6. Review procedures for protection of adjacent buildings, roadways, landscaping, and traffic.

## 1.7 PROJECT CONDITIONS

- A. Buildings to be demolished will be vacated and their use discontinued before start of the Work.
- B. Some buildings on adjacent properties to demolition area will be occupied. Conduct building demolition so operations of occupied buildings, including vehicular and pedestrian access, utilities, and door openings will not be disrupted.
  - 1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.
  - 2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.
    - a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.
- C. Owner assumes no responsibility for buildings and structures to be demolished.
  - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- D. Hazardous Materials: No suspect materials are known to exist on the site. If suspect materials are encountered by the Contractor during the construction period, the Contractor shall immediately notify the Owner for testing and removal of such materials.
- E. On-site storage or sale of removed items or materials is not permitted.

## 1.8 COORDINATION

- A. Arrange demolition schedule so as not to interfere with operations of adjacent occupied buildings.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.
- B. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.
- C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

### 3.2 PREPARATION

- A. Refrigerant: Remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction before starting demolition.
- B. Existing Utilities: Locate, identify, disconnect, and seal or cap off utilities serving buildings and structures to be demolished.
  - 1. Arrange to shut off indicated utilities with utility companies.
  - 2. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
  - 3. Cut off pipe or conduit at edge of Project Site. Cap, valve, or plug and seal portion of pipe or conduit to remain after bypassing according to requirements of authorities having jurisdiction.
- C. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
  - 1. Strengthen or add new supports when required during progress of demolition.

### 3.3 PROTECTION

- A. Existing Facilities: Protect adjacent walkways, loading access and pathways, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.
- B. Existing Utilities: Maintain utility services to remain and protect from damage during demolition operations.
  - 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
  - 2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and authorities having jurisdiction.

- a. Provide at least 72 hours' notice to occupants of affected buildings if shutdown of service is required during changeover.
- C. Temporary Protection:
1. Protect adjacent buildings and facilities from damage due to demolition activities.
  2. Protect existing site improvements, appurtenances, and landscaping to remain.
  3. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  4. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
- D. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

### 3.4 DEMOLITION, GENERAL

- A. General: Demolish indicated buildings and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
  2. Maintain fire watch during and for at least 24 hours after flame cutting operations.
  3. Maintain adequate ventilation when using cutting torches.
  4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- B. Engineering Surveys: During demolition, perform surveys to detect hazards that may result from building demolition activities.
- C. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
  2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- D. Explosives: Use of explosives is not permitted.

### 3.5 DEMOLITION BY MECHANICAL MEANS

- A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- B. Below-Grade Construction: Demolish foundation walls, slab, grade beams, and other below-grade construction.
1. Remove below-grade construction, including grade beams, foundation walls, and footings, completely.
  2. Remove existing piling to at least 3'-0" below adjacent existing grade. Locate all existing piles as part of Final Property Survey.

- C. Existing Utilities: Demolish and remove existing utilities and below-grade utility structures.
  - 1. Piping: Disconnect piping at unions, flanges, valves, or fittings back to public right-of-way.
  - 2. Wiring Ducts: Disassemble into unit lengths and remove plug-in and disconnecting devices.
  - 3. Remove all piping and conduits serving buildings scheduled to be demolished to edge of site denoted by fencing or property line. Cap at source and indicate capping location on record drawings.
  - 4. Prepare utility services for connections to new construction.

### 3.6 REPAIRS

- A. Promptly repair damage to adjacent buildings and landscaping caused by demolition operations.
- B. All damages to existing facilities and adjacent properties, or any other damage resulting from demolition operations must be repaired, renewed, or replaced to match existing by the Contractor at no additional cost to any other party.

### 3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and legally dispose of them in an approved landfill acceptable to authorities having jurisdiction.
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Do not burn demolished materials.

### 3.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.
  - 1. Clean roadways of debris caused by demolition procedures and debris transport.

**END OF SECTION 02 41 16**



## SECTION 033000 - CAST-IN-PLACE CONCRETE

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes cast-in place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes.

#### 1.2 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 /Specification Sections.
- B. Shop drawings for reinforcement, for fabrication, bending, and placement of concrete reinforcement. Comply with ACI SP-66 (88), "ACI Detailing Manual," showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures.
  - 1. Engineer's review is for general compliance only. Design of formwork for structural stability and efficiency is Contractor's responsibility.
- C. Laboratory test reports for concrete materials and mix design test.

#### 1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications, and standards, except where more stringent requirements are shown or specified:
  - 1. ACI 301, "Specifications for Structural Concrete for Buildings."
  - 2. ACI 318, "Building Code Requirements for Reinforced Concrete."
  - 3. ACI 387, "Recommended Practice for Concrete Formwork."
  - 4. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice."
- B. Concrete Contractor Qualifications:
  - 1. Formwork Contractor Qualifications: All work specified in this section and shown on the drawings shall be performed by a qualified contractor. The contractor shall have the experience, skilled personnel and proper equipment to satisfactorily perform the required work. In addition, the contractor shall have a minimum of five (5) years experience in concrete work, and shall have successfully completed five (5) projects of a scale and quality similar to this project.
- C. Materials and installed work may require testing and retesting at any time during progress of work. Tests, including retesting of rejected materials for installed work, shall be done by an Independent Testing Lab at Contractor's expense.

### PART 2 - PRODUCTS

#### 2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Plywood, hardboard, metal, metal-framed plywood faced, or other acceptable

panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Use overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form," Class I.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
- C. Form Coatings: Provide commercial formulation form-coating compounds with a maximum VOC of 350 mg/l that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to exposed surface.

## 2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric in sheets.
- D. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire-bar-type supports complying with CRSI specifications.
1. For slabs-on-grade, use supports with sand plates or horizontal runners or concrete bricks where base material will not support chair legs.
  2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs that are plastic protected CRSI, Class 1.

## 2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
1. Use one brand of cement throughout project unless otherwise acceptable to Architect.
- B. Normal Weight Aggregates: ASTM C 33 and as herein specified. Provide aggregates from a single source for exposed concrete.
1. For exterior exposed surfaces, do not use fine or coarse aggregates containing spalling-causing deleterious substances.
- C. Water: Potable
- D. Air Entrainment in accordance with ASTM C 260.
- E. Submit all proposed admixtures for review prior to construction. No admixtures are allowed without the written consent of the architect.

## 2.4 RELATED MATERIALS

- A. Vapor Retarder: Provide vapor retarder cover over prepared base material where indicated below slabs on grade. Use only materials that are resistant to deterioration when tested in accordance with ASTM E 154, as follows:
1. Polyethylene sheet not less than 10 mils thick.
- B. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- C. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
1. Waterproof paper.
  2. Polyethylene film.
  3. Polyethylene-coated burlap.
- D. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include the following:
    - a. "A-H 3 Way Sealer," Anti-Hydro Co., Inc.
    - b. "Spartan-Cote," The Burke Co.
    - c. "Conspec #1," Conspec Marketing & Mfg. Co.
    - d. "Hardtop," Cormix.
    - e. "Day-Chem Cure and Seal," Dayton Superior Corp.
    - f. "Euco Cure," Euclid Chemical Co.
    - g. "Horn Clear Seal," A.C. Horn, Inc.
    - h. "L&M Cure," L & M Construction Chemicals, Inc.
    - i. "Masterkure," Master Builders, Inc.
    - j. "CS-309," W.R. Meadows, Inc.
- E. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type I, Class B.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include the following:
    - a. "Highseal," Conspec Marketing and Mfg. Co.
    - b. "Safe Cure and Seal," Dayton Superior Corp.
    - c. "Aqua-Cure," Euclid Chemical Co.
    - d. "Dress & Seal #18WB," L&M Construction Chemicals, Inc.
    - e. "Masterseal W," Master Builders, Inc.
    - f. "Intex," W.R. Meadows, Inc.
    - g. "Sika Membrane," Sika Corp.
- F. Bonding Compound: Polyvinyl acetate or acrylic base.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include the following:
    - a. Polyvinyl Acetate (Interior Only):
      - 1) "Superior Concrete Bonder," Dayton Superior Corp.
      - 2) "Euco Weld," Euclid Chemical Co.
      - 3) "Weld-Crete," Larsen Products Corp.

- 4) "Everweld," L&M Construction Chemicals, Inc.
- b. Acrylic or Styrene Butadiene:
  - 1) "Acrylic Bondcrete," The Burke Co.
  - 2) "Strongbond," Conspec Marketing and Mfg. Co.
  - 3) "Day-Chem Ad Bond," Dayton Superior Corp.
  - 4) "SBR Latex," Euclid Chemical Co.
- G. Concrete Sealer and Hardener. A ready to use concrete sealer and hardener shall be applied to the concrete slab as indicated on the drawings in strict accordance with the manufacturers written specifications. The sealer must be guaranteed for 10 years against dusting.
  1. Approved Products. Conspec Intraseal or approved equal.
- H. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material "Type," "Grade," and "Class" to suit project requirements.
  1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include the following:
    - a. "Burke Epoxy M.V.," The Burke Co
    - b. "Spec-Bond 100," Conspec Marketing and Mfg. Co.
    - c. "Euco Epoxy System #452 or #620," Euclid Chemical Co.
    - d. "Epoxite Binder 2390," A.C. Horn, Inc.
    - e. "Epabond," L&M Construction Chemicals, Inc.
    - f. "Concresive 1001," Master Builders, Inc.
    - g. "Sikadur 32 Hi-Mod," Sika Corp.

## 2.5 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.
- B. Submit written reports to Engineer of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until proposed mix designs have been reviewed by Engineer.
- C. Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules:
  1. 4000-psi, 28-day compressive strength. 2% maximum air content for building slab. 5% maximum air content for exterior walks and paving. Interior concrete shall have a maximum W/C ratio of 0.45. Exterior shall have a maximum W/C ratio of 0.50. Fly Ash (20% Maximum) may be incorporated into the mix designs.
- D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.

## 2.6 ADMIXTURES

- A. Use water-reducing admixture in concrete as required for placement and workability.
- B. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F.
- C. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content as indicated:
  - 1. 5 percent air in exterior applications.
- D. Use admixtures for water reduction and set control in strict compliance with manufacturer's directions.
  
- E. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
  - 1. Ramps, slabs, and sloping surfaces: Not more than 3 inches.
  - 2. Reinforced foundation systems: Not more than 5 inches.
  - 3. Other concrete: Not more than 4 inches.

## 2.7 CONCRETE MIXING

- A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as specified.
  - 1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel.

### 3.2 FORMS

- A. General: Design, erect, support, brace, and maintain formwork to support vertical and lateral, static and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances complying with ACI 347.
- B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.

- C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
- D. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- F. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
- G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before concrete is placed. Retighten forms and bracing before concrete placement as required to prevent mortar leaks and maintain proper alignment.

### 3.3 VAPOR RETARDER/BARRIER INSTALLATION

- A. General: Following leveling and tamping of base for slabs on grade, place vapor retarder/barrier sheeting with longest dimension parallel with direction of pour.
- B. Lap joints 6 inches and seal vapor barrier joints with manufacturers' recommended mastic and pressure-sensitive tape.

### 3.4 PLACING REINFORCEMENT

- A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as herein specified.
  - 1. Avoiding cutting or puncturing vapor retarder during reinforcement placement and concreting operations.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Architect.
- D. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

### 3.5 JOINTS

- A. Construction Joints: Locate and install construction joints so as not to impair strength and appearance of the

structure, as acceptable to Architect.

- B. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as otherwise indicated.

### 3.6 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto.
- B. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to obtain required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

### 3.7 PREPARATION OF FORM SURFACES

- A. General: Coat contact surfaces of forms with an approved, non-residual, low-VOC, form-coating compound before reinforcement is placed.
- B. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.
- C. Coat steel forms with a non-staining, rust-preventative material. Rust-stained steel formwork is not acceptable.

### 3.8 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work.
- B. General: Comply with ACI 304, "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete," and as herein specified.
- C. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete that has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete to avoid segregation at its final location.
- D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
  - 1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.
  - 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

- E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
  - 1. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
  - 3. Maintain reinforcing in proper position during concrete placement.
- F. Cold-Weather Placing: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
- G. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
  - 1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  - 2. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
- H. Hot-Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
  - 1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg F (32 deg C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.
  - 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
  - 3. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed.
  - 4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, when acceptable to Architect.

### 3.9 FINISH OF FORMED SURFACES

- A. Rough Form Finish: For formed concrete surfaces not exposed to view in the finish work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.
- B. Smooth Form Finish: For formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, damp-proofing, veneer plaster, painting, or other similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
- C. Smooth Rubbed Finish: Provide smooth rubbed finish to all exterior and interior exposed concrete surfaces, which have received smooth form finish treatment, not later than one day after form removal.
  - 1. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final

surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

### 3.10 MONOLITHIC SLAB FINISHES

- A. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and as otherwise indicated.
  - 1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- B. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed to view and slab surfaces to be covered with resilient flooring or other thin film finish coating system.
  - 1. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance. Grind smooth surface defects that would telegraph through applied floor covering system.

### 3.11 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather, protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply in accordance with manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- C. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as herein specified. **The contractor shall verify the compatibility of any curing compound used with sealers, coatings or finished floor adhesives and materials.**
- D. Provide moisture curing by following methods.
  - 1. Keep concrete surface continuously wet by covering with water.
  - 2. Use continuous water-fog spray.
  - 3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4-inch lap over adjacent absorptive covers.
- E. Provide moisture-cover curing as follows:
  - 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- F. Provide curing and sealing compound to exposed interior slabs and to exterior slabs, walks, and curbs as follows:

1. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
  2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.
- G. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- H. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces, by application of appropriate curing method.
- I. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

### 3.12 REMOVAL OF FORMS

- A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 48 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days and until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

### 3.13 REUSE OF FORMS

- A. Clean and repair surfaces of forms to be reused in work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces except as acceptable to Architect.

### 3.14 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect.
1. Cut out honeycomb, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts, down to solid concrete but in no case to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent. Place patching mortar before bonding compound has dried.

2. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- B. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry-pack mortar, or precast cement cone plugs secured in place with bonding agent.
1. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- C. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having required slope.
1. Repair finished unformed surfaces that contain defects that affect durability of concrete. Surface defects, as such, include crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, popouts, honeycomb, rock pockets, and other objectionable conditions.
  2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
  3. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with patching compound. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.
  4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- D. Repair isolated random cracks and single holes not over 1 inch in diameter by dry-pack loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry-pack before bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.
- F. Repair methods not specified above may be used, subject to acceptance of Architect.

### 3.15 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. General: The Owner shall pay for Independent Testing Laboratory Services. Reference Section 01 40 00 "Quality Requirements."
- B. Sampling and testing for quality control during placement of concrete may include the following, as directed by Architect.
- C. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

1. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
  2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
  3. Concrete Temperature: Test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and each time a set of compression test specimens is made.
  4. Compression Test Specimen: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cure test specimens are required.
  5. Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yds. plus additional sets for each 50 cu. yds. more than the first 25 cu. yds. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
  6. When frequency of testing will provide fewer than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
  7. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.
  8. Interior concrete slabs shall be tested for flatness according to ACI 117, F Number measuring system. Minimum F numbers shall be Ff 30 and FI 20.
- D. Test results will be reported in writing to Architect, Structural Engineer, Ready-Mix Producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- F. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.

**END OF SECTION 03 30 00**

## SECTION 04 22 00 - CONCRETE UNIT MASONRY

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Concrete masonry units (CMU's).
  - 2. Steel reinforcing bars.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For reinforcing steel. Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type and size of product indicated. For masonry units include data on material properties.
- B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
  - 1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
  - 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

#### 1.4 QUALITY ASSURANCE

- A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

#### 1.5 PROJECT CONDITIONS

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

**PART 2 - PRODUCTS****2.1 MASONRY UNITS, GENERAL**

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

**2.2 CONCRETE MASONRY UNITS**

- A. CMUs: ASTM C 90.
  - 1. Density Classification: Normal weight unless otherwise indicated.

**2.3 MORTAR AND GROUT MATERIALS**

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C 91.
- E. Mortar Cement: ASTM C 1329.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Lafarge North America Inc.
- F. Aggregate for Mortar: ASTM C 144.
  - 1. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
  - 2. White-Mortar Aggregates: Natural white sand or crushed white stone.
  - 3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- G. Aggregate for Grout: ASTM C 404.
- H. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- I. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs, containing integral water repellent by same manufacturer.
- J. Water: Potable.

## 2.4 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).
- B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
  - 1. Exterior Walls: Hot-dip galvanized, carbon steel.
  - 2. Wire Size for Side Rods: 0.187-inch (4.76-mm) diameter.
  - 3. Wire Size for Cross Rods: 0.187-inch (4.76-mm) diameter.
  - 4. Wire Size for Veneer Ties: 0.148-inch (3.77-mm) diameter.
  - 5. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (407 mm) o.c.
  - 6. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.

## 2.5 TIES AND ANCHORS

- A. Materials: Provide brick ties specified in accordance with Specification Section 04 21 13, labeled "Brick Masonry" unless otherwise indicated.
- B. Anchor Bolts: L-shaped steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

## 2.6 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
  - 1. Do not use calcium chloride in mortar or grout.
  - 2. For exterior masonry, use portland cement-lime mortar.
  - 3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.
  - 1. For reinforced masonry, use Type S.
  - 2. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
  - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
  - 2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi (14 MPa).
  - 3. Provide grout with a slump of 8 to 11 inches (203 to 279 mm) as measured according to ASTM C 143/C 143M.

## PART 3 - EXECUTION

### 3.1 TOLERANCES

#### A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

#### B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.

#### C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).

### 3.2 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- C. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

- F. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

### 3.3 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
  - 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
  - 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
  - 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
  - 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

### 3.4 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
  - 1. Space reinforcement not more than as follows:
    - a. Horizontal reinforcing shall be continuous hot dipped galvanized truss-type reinforcing, 16" o.c..
    - b. Vertical reinforcing shall be #4 cont. @32" o.c. in grout-filled CMU cores.
  - 2. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.

### 3.5 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
  - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
  - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
  - 1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
  - 2. Limit height of vertical grout pours to not more than 60 inches (1520 mm).

### 3.6 REPAIRING, POINTING, AND CLEANING

- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

### 3.7 MASONRY WASTE DISPOSAL

- A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
  - 1. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.
- B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04 22 00

## SECTION 04 43 13.13 - ANCHORED STONE MASONRY VENEER

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Stone masonry anchored to unit masonry backup.
- B. Related Requirements:
  - 1. Section 04 22 00 "Concrete Unit Masonry" for concealed flashing, horizontal joint reinforcement, and veneer anchors.

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each variety of stone, stone accessory, and manufactured product.
- B. Samples for Initial Selection: For colored mortar and other items involving color selection.
- C. Samples for Verification:
  - 1. For each stone type indicated. Include at least three Samples in each set and show the full range of color and other visual characteristics in completed Work.
  - 2. For each color of mortar required.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, supply sources, and other information as required to identify materials used. Include mix proportions for mortar and source of aggregates.
  - 1. Neither receipt of list nor approval of mockups constitutes approval of deviations from the Contract Documents contained in mockups unless Architect approves such deviations in writing.

## 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs experienced stonemasons and stone fitters.
- B. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
  - 1. Build mockup of typical wall area as shown on Drawings.
  - 2. Build mockups for typical exterior wall in sizes approximately 1200 mm (48 inches) long by 1200 mm (48 inches) high by full thickness, including face and backup wythes and accessories.
    - a. Include stone coping/ sloped cap at top of mockup, as indicated in the drawings.
    - b. Include a sealant-filled joint at least 400 mm (16 inches) long in mockup.
    - c. Include through-wall flashing installed for a 600-mm (24-inch) length in corner of mockup approximately 400 mm (16 inches) down from top of mockup, with a 300-mm (12-inch) length of flashing left exposed to view (omit stone masonry above half of flashing).
    - d. Include metal veneer anchors, flashing, and weep holes in exterior masonry-veneer wall mockup.
  - 3. Protect accepted mockups from the elements with weather-resistant membrane.
  - 4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- B. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- C. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, in a dry location, or in covered weatherproof dispensing silos.
- D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

## 1.8 FIELD CONDITIONS

- A. Protection of Stone Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed stone masonry when construction is not in progress.
  - 1. Extend cover a minimum of 600 mm (24 inches) down both sides and hold cover securely in place.
- B. Stain Prevention: Immediately remove mortar and soil to prevent them from staining stone masonry face.
  - 1. Protect base of walls from rain-splashed mud and mortar splatter using coverings spread on the ground and over the wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 4. Turn scaffold boards near the wall on edge at end of each day to prevent rain from splashing mortar and dirt on completed stone masonry.

- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace stone masonry damaged by frost or freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
  - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 4 deg C (40 deg F) and above and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

## 1.9 COORDINATION

- A. Advise installers of other work about specific requirements for placement of reinforcement, veneer anchors, flashing, and similar items to be built into stone masonry.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations for Stone: Obtain stone, from single quarry, with resources to provide materials of consistent quality in appearance and physical properties.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of uniform quality for each cementitious component from single manufacturer and each aggregate from single source or producer.

### 2.2 LIMESTONE

- A. Material Standard: Comply with ASTM C 568.
  - 1. Classification: III High Density.
- B. Description: Random Indiana Limestone.
- C. Varieties and Sources: Indiana limestone quarried in Lawrence, Monroe, or Owen Counties, Indiana.
- D. Match Architect's samples for color, finish, and other stone characteristics relating to aesthetic effects.

### 2.3 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type II, except Type III may be used for cold-weather construction; natural color or white cement may be used as required to produce mortar color indicated.
  - 1. Low-Alkali Cement: Not more than 0.60 percent total alkali when tested according to ASTM C 114.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Holcim (US) Inc.
  - b. Lafarge North America Inc.
  - c. Lehigh Hanson; HeidelbergCement Group.
- D. Mortar Cement: ASTM C 1329.
- E. Masonry Cement: ASTM C 91.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Holcim (US) Inc.
    - b. Lafarge North America Inc.
    - c. Lehigh Hanson; HeidelbergCement Group.
- F. Aggregate: ASTM C 144 and as follows:
1. For pointing mortar, use aggregate graded with 100 percent passing 1.18-mm (No. 16) sieve.
  2. White Aggregates: Natural white sand or ground white stone.
  3. Colored Aggregates: Natural-colored sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.
    - a. Match Architect's sample.
- G. Water: Potable.

## 2.4 VENEER ANCHORS

- A. Materials:
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2.
  2. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304.
  3. Hot-Dip Galvanized-Steel Sheet: ASTM A 1008/A 1008M, cold-rolled, carbon-steel sheet, hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M, Class B-2.
  4. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.
- B. Size: Sufficient to extend at least halfway, but not less than 38 mm (1-1/2 inches), through stone masonry and with at least a 16-mm (5/8-inch) cover on exterior face.
- C. Wire Veneer Anchors: Wire ties formed from W1.7 or 3.8-mm- (0.148-inch-) diameter, hot-dip galvanized steel wire.
1. Ties are bent in the form of loops with legs not less than 381 mm (15 inches) in length and with last 50 mm (2 inches) bent at 90 degrees.
  2. Ties are bent in the form of rectangular loops with ends bent downward for inserting into eyes projecting from masonry joint reinforcement specified in Section 04 20 00 "Unit Masonry."
  3. Ties are bent in the form of triangular loops designed to be attached to masonry joint reinforcement specified in Section 04 20 00 "Unit Masonry" with vertical wires passing through ties and through eyes projecting from masonry joint reinforcement.
- D. Polymer-Coated, Steel Tapping Screws for Concrete Masonry: Self-tapping screws with specially designed threads for tapping and wedging into masonry, with hex washer head and neoprene washer, 4.8-mm (3/16-inch) diameter by 38-mm (1-1/2-inch) length, and with organic polymer coating with more than 800-hour, salt-spray resistance to red rust per ASTM B 117.

## 2.5 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual and as follows:
1. Stainless Steel: ASTM A 240/A 240M, Type 304, 0.4 mm (0.016 inch) thick.
  2. Fabricate through-wall metal flashing embedded in masonry from stainless steel, with ribs at 75-mm (3-inch) intervals along length of flashing to provide an integral mortar bond.
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) Cheney Flashing Company.
      - 2) Keystone Flashing Company, Inc.
      - 3) Sandell Manufacturing Co., Inc.
  3. Fabricate through-wall flashing with drip edge indicated. Fabricate by extending flashing 13 mm (1/2 inch) out from wall, with outer edge bent down 30 degrees.
  4. Metal Expansion-Joint Strips: Fabricate from stainless steel to shapes indicated.
- B. Application: Unless otherwise indicated, use the following:
1. Where flashing is indicated to receive counterflashing, use metal flashing.
  2. Where flashing is indicated to be turned down at or beyond wall face, use metal flashing.
  3. Where flashing is fully concealed, use metal flashing.
- C. Solder and Sealants for Sheet Metal Flashings:
1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
  2. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
  3. Elastomeric Sealant: ASTM C 920, chemically curing urethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- D. Adhesives, Primers, and Seam Tapes for Flexible Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

## 2.6 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated.
- B. Cementitious Dampproofing for Limestone: Cementitious formulation recommended by ILI and nonstaining to stone, compatible with joint sealants, and noncorrosive to veneer anchors and attachments.
- C. Asphalt Dampproofing: Cut-back asphalt complying with ASTM D 4479, Type I.
- D. Weep/Vent Products: Use the following unless otherwise indicated:
1. Aluminum Weep Holes/Vents: One-piece, L-shaped units made from sheet aluminum, designed to fit into head joint and consisting of vertical channel with louvers stamped in web and with top flap to keep mortar out of head joint; painted to comply with Section 09 91 13 - Exterior Painting, before installation, in color approved by Architect to match that of mortar.
    - a. Manufacturers: Subject to compliance with requirements, provide products by the following:

- 1) Hohmann & Barnard, Inc.

## 2.7 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar and grout stains, efflorescence, and other new construction stains from stone masonry surfaces without discoloring or damaging masonry surfaces; expressly approved for intended use by cleaner manufacturer and stone producer.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Diedrich Technologies, Inc.; a division of Sandell Construction Solutions.
    - b. Hydroclean; Hydrochemical Techniques, Inc.
    - c. PROSOCO, Inc.

## 2.8 FABRICATION

- A. General: Fabricate stone units in sizes and shapes required to comply with requirements indicated.
  1. For limestone, comply with recommendations in ILL's "Indiana Limestone Handbook."
- B. **Split** stone to produce pieces of thickness, size, and shape indicated, including details on Drawings and pattern specified in "Setting Stone Masonry" Article.
  1. Shape stone specified to be laid in three-course, random range ashlar pattern with sawed beds.
- C. Dress joints (bed and vertical) straight and at right angle to face unless otherwise indicated. Shape beds to fit supports.
- D. Cut and drill sinkages and holes in stone for anchors and supports.
- E. Carefully inspect stone at quarry or fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units before shipment.
  1. Clean sawed backs of stone to remove rust stains and iron particles.
- F. Thickness of Stone: Provide thickness indicated, but not less than the following:
  1. Thickness: 100 mm (4 inches) plus or minus 13 mm (1/2 inch).
- G. Finish exposed stone faces and edges to comply with requirements indicated for finish and to match approved samples and mockups.
  1. Finish: Split face.
  2. Finish for Copings/ To Cap: Smooth; sand-rubbed top.
    - a. Finish exposed ends of copings same as front and back faces.

## 2.9 MORTAR MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride.
  2. Use portland cement-lime mortar unless otherwise indicated.
  3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
  4. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding water. Then mix again, adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for one to two hours. Add remaining water in small portions until mortar reaches required consistency. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Stone Masonry: Comply with ASTM C 270 Specification.
1. Mortar for Setting Stone: Type N.
  2. Mortar for Pointing Stone: Type N.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine surfaces indicated to receive stone masonry, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of stone masonry.
- B. Examine substrate to verify that dovetail slots, inserts, reinforcement, veneer anchors, flashing, and other items installed in substrates and required for or extending into stone masonry are correctly installed.
- C. Examine wall framing, sheathing, and weather-resistant sheathing paper to verify that stud locations are suitable for spacing of veneer anchors and that installation will result in a weatherproof covering.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Accurately mark stud centerlines on face of weather-resistant sheathing paper before beginning stone installation.
- B. Coat concrete and unit masonry backup with asphalt dampproofing.
- C. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.

#### 3.3 SETTING STONE MASONRY

- A. Perform necessary field cutting and trimming as stone is set.
  1. Use power saws to cut stone that is fabricated with saw-cut surfaces. Cut lines straight and true, with edges eased slightly to prevent snipping.
  2. Use hammer and chisel to split stone that is fabricated with split surfaces. Make edges straight and true, matching similar surfaces that were shop or quarry fabricated.

3. Pitch face at field-split edges as needed to match stones that are not field split.
- B. Sort stone before it is placed in wall to remove stone that does not comply with requirements relating to aesthetic effects, physical properties, or fabrication, or that is otherwise unsuitable for intended use.
- C. Arrange stones in three-course, random-range ashlar pattern with random course heights, random lengths (interrupted coursed), and uniform joint widths.
- D. Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.
- E. Set stone to comply with requirements indicated on Drawings. Install supports, fasteners, and other attachments indicated or necessary to secure stone masonry in place. Set stone accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
- F. Maintain uniform joint widths except for variations due to different stone sizes and where minor variations are required to maintain bond alignment if any. Lay walls with joints not less than 6 mm (1/4 inch) at narrowest points or more than 10 mm (3/8 inch) at widest points.
- G. Provide sealant joints of widths and at locations indicated.
  1. Keep sealant joints free of mortar and other rigid materials.
  2. Sealing joints is specified in Section 07 92 00 "Joint Sealants."
- H. Install metal expansion strips in sealant joints at locations indicated. Build flanges of expansion strips into masonry by embedding in mortar between stone masonry and backup wythe. Lap each joint 100 mm (4 inches) in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
- I. Install embedded flashing and weep holes at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
  1. At concrete masonry backing, extend flashing through stone masonry, turned up a minimum of 200 mm (8 inches), and insert in masonry joint.
  2. Cut flexible flashing flush with wall face after completing masonry wall construction.
- J. Coat limestone with cementitious dampproofing as follows:
  1. Stone at Grade: Beds, joints, and back surfaces to at least 300 mm (12 inches) above finish-grade elevations.
  2. Stone Extending below Grade: Beds, joints, back surfaces, and face surfaces below grade.
  3. Allow cementitious dampproofing formulations to cure before setting dampproofed stone. Do not damage or remove dampproofing in the course of handling and setting stone.
- K. Place weep holes and vents in joints where moisture may accumulate, including at base of cavity walls, above shelf angles, and at flashing.
- L. Install vents in head joints at top of each continuous cavity at spacing indicated. Use aluminum weep holes/vents to form vents.
  1. Close cavities off vertically and horizontally with blocking. Install through-wall flashing and weep holes above horizontal blocking.

### 3.4 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed 6 mm in 3 m (1/4 inch in 10 feet), 10 mm in 6 m (3/8 inch in 20 feet), or 13 mm in 12 m (1/2 inch in 40 feet) or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 6 mm in 6 m (1/4 inch in 20 feet) or 13 mm in 12 m (1/2 inch in 40 feet) or more.
- B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 6 mm in 6 m (1/4 inch in 20 feet) or 13 mm in 12 m (1/2 inch in 40 feet) or more.
- C. Variation of Linear Building Line: For position shown in plan, do not exceed 13 mm in 6 m (1/2 inch in 20 feet) or 19 mm in 12 m (3/4 inch in 40 feet) or more.
- D. Measure variation from level, plumb, and position shown in plan as a variation of the average plane of each stone face from level, plumb, or dimensioned plane.
- E. Variation in Mortar-Joint Thickness: Do not vary from joint size range indicated.
- F. Variation in Plane between Adjacent Stones: Do not exceed one-half of tolerance specified for thickness of stone.

### 3.5 INSTALLATION OF ANCHORED STONE MASONRY

- A. Anchor stone masonry to concrete with corrugated-metal veneer anchors unless otherwise indicated. Secure anchors by inserting dovetailed ends into dovetail slots in concrete.
- B. Anchor stone masonry to unit masonry with individual wire veneer anchors unless otherwise indicated. Embed anchors in unit masonry mortar joints or grouted cells at a distance of at least one-half of unit masonry thickness.
- C. Embed veneer anchors in mortar joints of stone masonry at least halfway, but not less than 38 mm (1-1/2 inches), through stone masonry and with at least a 16-mm (5/8-inch) cover on exterior face.
- D. Space anchors not more than 400 mm (16 inches) o.c. vertically and 600 mm (24 inches) o.c. horizontally. Install additional anchors within 300 mm (12 inches) of openings, sealant joints, and perimeter at intervals not exceeding 300 mm (12 inches).
- E. Set stone in full bed of mortar with full head joints unless otherwise indicated. Build anchors into mortar joints as stone is set.
- F. Provide 25-mm (1-inch) cavity between stone masonry and backup construction unless otherwise indicated. Keep cavity free of mortar droppings and debris.
  - 1. Slope beds toward cavity to minimize mortar protrusions into cavity.
  - 2. Do not attempt to trowel or remove mortar fins protruding into cavity.
- G. Rake out joints for pointing with mortar to depth of not less than 13 mm (1/2 inch) before setting mortar has hardened. Rake joints to uniform depths with square bottoms and clean sides.

### 3.6 POINTING

- A. Prepare stone-joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply pointing mortar in layers not more than 10 mm (3/8 inch) deep until a uniform depth is formed.

- B. Point stone joints by placing and compacting pointing mortar in layers of not more than 10 mm (3/8 inch) deep. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
- C. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce the following joint profile:
  - 1. Joint Profile: Smooth, flat face recessed 6 mm (1/4 inch) below edges of stone (raked joint).

### 3.7 ADJUSTING AND CLEANING

- A. Remove and replace stone masonry of the following description:
  - 1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Architect.
  - 2. Defective joints.
  - 3. Stone masonry not matching approved samples and mockups.
  - 4. Stone masonry not complying with other requirements indicated.
- B. Replace in a manner that results in stone masonry matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean stone masonry as work progresses. Remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before cleaning stone masonry.
  - 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
  - 4. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.
  - 5. Clean stone masonry by bucket and brush hand-cleaning method described in BIA Technical Note No. 20, Revised II, using job-mixed detergent solution.
  - 6. Clean stone masonry with proprietary acidic cleaner applied according to manufacturer's written instructions.
  - 7. Clean limestone masonry to comply with recommendations in ILI's "Indiana Limestone Handbook."

### 3.8 EXCESS MATERIALS AND WASTE

- A. Excess Stone: Stack excess stone where directed by Owner for Owner's use.
- B. Disposal as Fill Material: Dispose of clean masonry waste, including mortar and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed.
  - 1. Crush masonry waste to less than 100 mm (4 inches) in greatest dimension.
  - 2. Do not dispose of masonry waste as fill within 450 mm (18 inches) of finished grade.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other waste, and legally dispose of off Owner's property.

END OF SECTION 04 43 13.13

## SECTION 05 12 00 - STRUCTURAL STEEL

### PART 1 GENERAL

#### 1.1 SUMMARY

The Contractor shall provide structural steel and accessories as shown on the drawings, as specified in this section, and as needed for a complete installation.

#### 1.2 SUBMITTAL

The Contractor shall submit sufficient technical data, and complete shop drawings showing all members, spans, connections and similar data to demonstrate compliance with the construction documents.

#### 1.3 QUALITY ASSURANCE

- A. The steel structure is a non-self-supporting steel frame, and is dependent upon diaphragm action of the metal roof deck for stability and resistance to wind forces. The Contractor shall provide all means and methods of temporary support necessary for stability and resistance to wind forces, until the steel frame, metal roof deck and all exterior walls are completely installed and are capable of providing support.
- B. The Contractor shall provide welding with electric arc process, in accordance with AWS "Code for Arc and Gas Welding in Building Construction" and all local codes having jurisdiction.
- C. In addition to complying with pertinent codes and regulations, all structural steel work shall comply with AISC "Specifications for Design, Fabrication, and Erection of Structural Steel for Building", AISC "Code of Standard Practice", and "Specification for Structural Joints Using ASTM A325 or A490 Bolts".
- D. Structural Steel Inspection: Structural steel inspection shall be provided per Section 01 40 00 "Quality Requirements."

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and storage:
  - 1. Deliver materials to the jobsite property marked to identify the location for which they are intended. Markings shall be used to correspond to symbols or notes shown on approved shop drawings.
  - 2. Store in manner to maintain identification and prevent damage, off the ground, using pallets or other supports, and to permit easy access for inspection.

#### 1.5 WARRANTY

The Contractor shall include a copy of the Steel Erector/ Installer's Warranty for all work provided under the general contract for construction for a term of 1 year after the Date of Substantial Completion in the Building Maintenance Manuals, submitted to the Landlord after the Date of Final Completion, in accordance with Contract Closeout requirements.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Provide the following where called for on the drawings or otherwise required.
1. Rolled steel shapes, plates and bars: ASTM A572 Grade 50.
  2. Cold formed steel plates, etc.: ASTM A283, Grade C.
  3. Steel Tubing: ASTM A500/A501, Grade B (Fb = 27,700 psi; E = 24,000,000 psi).
  4. Steel Pipe: ASTM A53, Type E or S, Grade B.
  5. Machine Bolts: ASTM A307, Grade A, and ANSI B18.2, square and/or hexagonal heads.
  6. High Strength Bolts: ASTM A325, Type F.
  7. Arc Welding Electrodes: ASTM A233, E70XX series.
  8. Primer: Meeting or exceeding Fed. Spec. TT-P-636, light gray primer on all exposed members.

### 2.2 FABRICATION

- A. Shop fabrication and assembly:
1. Fabricate items of structural steel in accordance with AISC specifications and as shown on the approved shop drawings.
  2. Where finishing is required complete the assembly, including welding of units, before starting of finishing.
  3. Provide finish surfaces of members exposed in the final structure free from marking, burrs, and other defects.
- B. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.
- C. Do NOT flame cut holes or enlarge holes by burning.

### 2.3 SHOP PAINTING

- A. General:
1. Thoroughly clean structural steel, removing all loose mill scale, grease, dirt, and foreign matter by scraping or sandblasting.
  2. Apply the specified paint to a dry film thickness not less than 1.5 mils.
- B. Do not paint contact surfaces of high strength bolted members.

### 2.4 GALVANIZING

- A. Provide in accordance with ASTM A123, minimum 1.25 oz. per square foot.
- B. Galvanize all steel items exposed to weather and/or as noted on drawings.

### 2.5 OTHER MATERIALS

Provide other materials, not specifically described but required for a complete and proper installation, as selected by the contractor, subject to approval.

## PART 3 EXECUTION

### 3.1 SURFACE CONDITIONS

- A. The Contractor shall examine the areas and conditions under which work of this section will be provided, shall correct conditions detrimental to the timely and proper completion of the work, and shall NOT proceed until unsatisfactory conditions are corrected.

### 3.2 ERECTION

A. Surveys:

1. Establish permanent benchmarks necessary for accurate erection of structural steel.
2. Check elevations of concrete surfaces and locations of anchor bolts and similar items, before erection proceeds.

B. Temporary shoring and bracing:

1. Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads.
2. Provide temporary guylines to achieve proper alignment of the structure for erection.
3. Remove temporary connections and members when permanent members are in place and final connections are made.

C. Anchor Bolts:

1. Furnish and install anchor bolts and other connections required for securing structural steel to adjacent work.
2. Provide templates and other devices as needed for presetting bolts and other anchors to accurate locations.

D. Setting bases and bearing plates:

1. Clean concrete bearing surfaces free from bond reducing materials, and then roughen to improve bond to surface.
2. Clean the bottom surface of base and bearing plates.
3. Set loose and attached base plates and bearing plates for structural members in wedges or other adjusting devices.
4. Tighten anchor bolts after supported members have been positioned and plumbed.
5. Do not remove wedge or shims but, if protruding, cut off flush with the edge of the base or bearing plate prior to packing with grout.
6. Pack non-shrink grout solidly between bearing surfaces and bases or plates to assure that no voids remain. Use non-shrink grout as specified in Section 03300- Cast-In-Place Concrete.
7. Finish exposed surfaces, protect installed materials, and allow to cure in strict compliance with the manufacturer's recommendations as approved.

E. Field Assembly:

1. Set structural frames accurately to the lines and elevations indicated.
2. Align and adjust the members forming part of a complete frame or structure before fastening permanently.
3. Clean the bearing surfaces and other surfaces which will be in permanent contact before assembly.
4. Adjust as required to compensate for discrepancies in elevation and alignment.

5. Level and plumb individual members of the structure within specified AISC tolerances.
6. Establish required leveling and plumbing measurements on the mean operating temperature of the structure, making allowances for the difference between temperature at time of erection and the mean temperature at which the structure will be when completed and in service.
7. Comply with AISC specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to welds.

F. Gas Cutting:

1. Do not use gas cutting torches for correcting fabricating errors in structural framing, except on secondary members where prior approval is obtained.
2. When gas cutting is permitted, finish the gas cut section to a sheared acceptable appearance.

### 3.3 PAINTING

A. Secure all required approvals of welding and connections prior to application of field primer.

B. Prime coat structural steel and fittings, except galvanized items, with light gray primer on all exposed members.

1. Prepare surfaces by removing loose rust, loose mill scale, spatter, slag and flux deposits.
2. Clean steel in accordance with Steel Structures Painting Council SP-3, "Power Tool Cleaning".
3. After erection, clean spots and surfaces where paint has been removed, damaged, or burned off, field bolts and other field connections not concealed in the finished work.
4. Remove dirt, oil and grease.
5. Apply a spot coat of the approved primer.
6. Do not apply paint to wet, damp, oily, or improperly prepared surfaces.
7. Spray apply the primer, filling joints and corners, and covering surfaces with a smooth unbroken film of at least 1.5 dry mils thickness.

### 3.4 STRUCTURAL STEEL INSPECTION AND PUNCHLIST

A. Structural Steel Inspection:

1. The Contractor shall notify the Testing Lab seven (7) days prior to requiring the final Structural Steel Inspection.
2. The Structural Steel Inspection will be provided by the Testing Lab and paid for by the Contractor in accordance with Section 014000.

B. Punchlist: The Structural Steel Punchlist will be provided by the Testing Lab and shall be completed by the Contractor in a timely manner.

C. Metal Deck Fastening Inspection: The Contractor shall provide a Metal Deck Fastening Inspection and report of the metal decking installation. Refer to Section 014000- Quality Control Procedures and Section 053000- Metal Decking.

**END OF SECTION 05 12 00**

## SECTION 05 50 00 - METAL FABRICATIONS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Metal bollards.
  - 2. Metal ladders and access prevention gates.
  - 3. Downspout boots.
- B. Products furnished, but not installed, under this Section include the following:
  - 1. Loose steel lintels.
  - 2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
  - 3. Cast-In-Place aluminum stair nosings.
- C. Related Requirements:
  - 1. Section 03 30 00 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, stair nosings, and other items cast into concrete.
  - 2. Section 04 20 00 "Unit Masonry" for installing loose lintels.

#### 1.3 ACTION SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details.[ Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.] Provide Shop Drawings for the following:
  - 1. Metal bollards.
  - 2. Loose steel lintels.
  - 3. Stair nosings.
  - 4. Metal ladder and access prevention gate.

### PART 2 - PRODUCTS

#### 2.1 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

## 2.2 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- B. Concrete: Comply with requirements in Section 03 30 00 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 20 MPa (3000 psi).

## 2.3 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

## 2.4 METAL BOLLARDS

- A. Fabricate metal bollards from galvanized Schedule 40 steel pipe.

## 2.5 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 200 mm (8 inches) unless otherwise indicated.
- C. Galvanize loose steel lintels located in exterior walls.

## 2.6 ALUMINUM STAIR NOSINGS

- A. Provide cast aluminum nosings on all exterior concrete steps, cast-in-place with poured concrete.
  - 1. Dimensions: 4" deep x 5/16" minimum thickness x length of the entire step at each location minus 8."
  - 2. Abrasion: Nosings to have recessed aluminum oxide abrasive strips with a checkerboard pattern.
  - 3. Anchors: Concealed, at least 2 per nosing.
  - 4. Manufacturers: Select product from one of the following: Wooster Products, Inc., Nystrom, Babcock-Davis, or Balco, Inc.

## 2.7 METAL ROOF ACCESS LADDER

- A. General:
  - 1. Comply with ANSI A14.3.
  - 2. All components shall be hot-dipped galvanized or stainless steel.

- B. Steel Ladders:
1. Space siderails 457 mm (18 inches) apart unless otherwise indicated.
  2. Siderails: Continuous, 9.5-by-64-mm (3/8-by-2-1/2-inch) steel flat bars, with eased edges.
  3. Rungs: 19-mm- (3/4-inch-) diameter steel bars.
  4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
  5. Support each ladder at top and bottom and not more than 1500 mm (60 inches) o.c. with welded or bolted steel brackets.
  6. Galvanize ladders, including brackets and fasteners.
- C. Access Prevention Gates: Provide 7'-0" high galvanized sheet metal with angle frame gate at each ladder, with continuous piano hinge and hasp at 48" above walkway for Owner supplied heavy-duty padlock. Turn back all edges of sheet metal on all sides.

## 2.8 METAL DOWNSPOUT BOOTS

- A. 36" high cast iron rectangular boots, fastened to wall with concealed blocking.
1. Coordinate with downspout size and shape.
  2. Paint boots 3 coats to match downspouts.
  3. Provide splashblocks where downspout boots empty into grass/ landscaping.

## 2.9 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

### 3.2 INSTALLING METAL BOLLARDS

- A. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches (75 mm) above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- B. Fill bollards solidly with concrete, mounding top surface to shed water.

### 3.3 INSTALLING STAIR NOSINGS

- A. Verify that all formwork conditions are secure and prepared for setting of stair nosings.

- B. Set stair nosings in formwork level, plumb, and straight. Variance between each stair tread/riser dimension not to exceed 1/16" and in accordance with all applicable codes. Top of stair nosings to be level with the surface of each stair tread.
- C. Fully cover and protect exposed nosing surfaces during concrete pour and finishing operations.
- D. Clean exposed concrete surfaces completely and immediately after the concrete pour.

**END OF SECTION 05 50 00**

## SECTION 05 52 00 - METAL RAILINGS

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

- A. Submittals: Product data, Shop Drawings, Structural analysis data signed and sealed by a qualified professional engineer registered in the state where Project is located, and manufacturer's color charts showing the full range of colors available for factory-applied finishes.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Aluminum Decorative Railings:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. F.S.I. Home Products, Inc. - Cullman, AL
    - b. Nexan Building Products – Cullman, AL

#### 2.2 PERFORMANCE REQUIREMENTS

- A. Railings shall be capable of withstanding a uniform load of 0.73 kN/m (50 lbf/ft.) and a concentrated load of 0.89 kN (200 lbf) applied to handrails and top rails of guards in any direction. Uniform and concentrated loads need not be assumed to act concurrently.
- B. Railing infill shall be capable of withstanding a concentrated load of 0.22 kN (50 lbf) applied horizontally on an area of 0.093 sq. m (1 sq. ft.). Infill load and other railing loads need not be assumed to act concurrently.

#### 2.3 METALS

- A. Steel Tubing: ASTM A 500/A 500M (cold formed) or ASTM A 513.
- B. Steel Pipe: ASTM A 53/A 53M, Schedule 40.
- C. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- D. Iron Castings: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.
- E. Extruded-Aluminum Bars, Shapes, and Tubing: ASTM B 221M (ASTM B 221), Alloy 6063-T5/T52.
- F. Extruded-Aluminum Structural Pipe and Round Tubing: ASTM B 429/B 429M, Alloy 6063-T6.
- G. Aluminum Plate and Sheet: ASTM B 209M (ASTM B 209).
- H. Aluminum Castings: ASTM B 26/B 26M, Alloy A356.0-T6.

- I. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
- J. Stainless-Steel Wire Rope: Wire rope made from wire complying with ASTM A 492, Type 316.
- K. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

## 2.4 OTHER MATERIALS

- A. Nonshrink, Nonmetallic Grout: ASTM C 1107; recommended by manufacturer for exterior applications.
- B. Shop Primer for Iron and Steel Railings: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.
- C. Shop Primer for Galvanized Railings: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

## 2.5 FABRICATION

- A. Assemble railing systems in shop to the greatest extent possible. Use connections that maintain structural value of joined pieces.
- B. Form changes in direction of railing members by using prefabricated fittings.
- C. Fabricate railing systems and handrails for connecting members with concealed mechanical fasteners and fittings.
- D. Provide manufacturer's standard wall brackets, flanges, miscellaneous fittings, and anchors to connect handrail and railing members to other construction.
- E. Provide wall returns at ends of wall-mounted handrails.

## 2.6 FINISHES

- A. Aluminum Railings: Class I, clear anodic finish; complying with AAMA 611.
- B. Aluminum Posts: High-performance organic; two-coat fluoropolymer system complying with AAMA 2604, with finish coats containing at least 70 percent PVDF resin by weight. Color as selected by Architect from Manufacturer's full range.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Fit exposed connections accurately together to form tight, hairline joints.
- B. Set railings accurately in location, alignment, and elevation and free of rack.
- C. Coat concealed aluminum surfaces that will be in contact with cementitious materials or dissimilar metals with a heavy coat of bituminous paint.

- D. Anchor posts in concrete by forming or core-drilling holes 125 mm (5 inches) deep and 19 mm (3/4 inch) greater than OD of post. Fill annular space between post and concrete with nonshrink, nonmetallic grout.
- E. Attach handrails to wall with wall brackets.

**END OF SECTION 05 52 00**



## SECTION 06 10 00 - ROUGH CARPENTRY

### PART 1 – GENERAL

#### 1.1 DESCRIPTION

- A. Comply with applicable requirements of DIVISION 1.
- B. Provide all labor, materials, supplies, services, supervision, project management, quality assurance, quality control, safety precautions/programs, equipment, tools, incidentals, supplies, consumables, accessories, handling and transportation necessary to complete all decking, sheathing, miscellaneous wood framing, blocking, cants, curbs, grounds, supports, bracing, and nailers, including fasteners, attachments, hardware, and connectors as required to complete the work of this Project.
  - 1. Structural floor, wall, ceiling and roof framing.
  - 2. Beams, posts and columns.
  - 3. Door and window opening framing.
  - 4. Partition framing and blocking.
  - 5. Furr down and chase wall framing.
  - 6. Stair, landing and ramp framing.
  - 7. Floor, wall and roof sheathing.
  - 8. Miscellaneous framing and sheathing.
  - 9. Miscellaneous blocking, bracing and supports.
  - 10. Concealed wood blocking for support of toilet and bath accessories, wall cabinets and wood trim.

#### 1.2 RELATED WORK

- A. Section 06 40 23 – “Interior Architectural Woodwork”
- B. Section 07 54 23 – “Thermoplastic Polyolefin (TPO) Roofing”
- C. Section 07 62 00 – “Sheet Metal Flashing and Trim”

#### 1.3 REFERENCE STANDARDS

- A. ALSC - American Lumber Standards Committee: Softwood Lumber Standards.
- B. ANSI A201.1 - Mat Formed Wood Particle Board.
- C. APA - American Plywood Association - Certified plywood.
- D. AWPA - American Wood Preservers Association Standard U1 and T1.
- E. FS - Federal Specifications.
- F. NFPA - National Forest Products Association. National Design Specification for Stress Grade Lumber and its Fastening.
- G. NHLA: National Hardware Lumber Association.
- H. PS1 - Construction and Industrial Plywood.

- I. PS-20 - American Softwood Lumber Standard.
- J. SFPA - Southern Forest Products Association.
- K. SPIB - Southern Pine Inspection Bureau - Grading Rules.
- L. ASTM D2559 – Standard Specification for Adhesives for Structural Laminated Wood Products for Use Under Exterior (Wet Use) Exposure Conditions
- M. Requirements of Local and State regulatory agencies.

#### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, handle, and protect products as per Division 1 requirements.
- B. Keep materials dry during delivery, handling, and storage. Protect against exposure to weather. Do not allow contact with wet or damp surfaces. Provide air circulation within stacks. Store six inches above the ground or higher and adequately cover with waterproof material while allowing proper air circulation. Do not allow any lumber or wood products to come in contact with the ground. Store off of the ground. Do not store the products of this section on grass, dirt or mud.
- C. Immediately upon delivery to site inspect lumber and other products of this Section for defects, damage and for conformance with the specified requirements. Remove defective, damaged or non-conforming materials from the site. Do not install defective, damaged or non-conforming materials. Follow applicable lumber grading agency standards in accepting or rejecting lumber products. Reject all lumber that is not properly grade stamped, marked and certified. Reject all lumber with moisture content above the levels specified.
- D. Only skilled workers shall handle the materials of this section. Handle lumber to avoid damage. Handle chemically treated lumber and plywood in strict accordance with manufacturer's instructions.
- E. Do not allow lumber to be dumped from the delivery truck.

#### 1.5 QUALITY ASSURANCE

- A. Rough Carpentry Lumber: Visible grade stamp, of agency certified by National Forest Products Association (NFPA).
- B. Lumber Standard: Comply with PS 20, except as otherwise indicated herein.
- C. Plywood Standard: Comply with PS 1, and APA grade trademarks.
- D. Factory mark each piece of lumber and plywood with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.
- E. Shop fabricate carpentry work to the extent feasible and where shop fabrications will result in better workmanship than feasible for on-site fabrication.
- F. Pressure-treated lumber shall conform to AWPA requirements for preservative treated materials. Provide pressure treated lumber and plywood in all locations indicated on the drawings and in the following locations: Exposed to exterior, in contact with concrete or other cementitious materials, in contact with masonry, all applications above the roof deck at and around the built-up roofing system. Also, lumber used to frame and surround windows and exterior doors shall be pressure treated.

- G. Perform work in accordance with AITC requirements and applicable building code requirements. Also, all work shall conform to NFPA Manual for Wood Frame Construction, NFPA National Design Specifications for Wood Construction and APA Plywood Specifications and Grade Guide.
- H. Submit manufacturer's written verification that treated lumber is fully compatible with all components of the roofing system and the flashing systems and fasteners to be installed on this Project.
- I. Installer Qualifications:
  - 1. Installer shall specialize in performing the work of this section, with five (5) years continuous documented experience in commercial wood framing system work.
  - 2. Use adequate number of highly skilled workmen who are competent, thoroughly trained and experienced in the necessary crafts and who are completely familiar with the tools and equipment of the trade, the specified requirements and methods needed for proper performance of the work of this Section.
  - 3. Adequate, competent constant supervision shall be provided to assure that the work is done in accordance with the highest standard practice and workmanship and in conformance with the drawings and specifications.
  - 4. Use equipment and tools adequate/appropriate in size, design and numbers in good repair to accomplish work in a timely and correct manner.
- J. Notify Architect and allow him to visit the site after all rough carpentry is complete and prior to closing any walls, ceilings, roofs, etc. Also, arrange all required inspections from the local authorities having jurisdiction.

## 1.6 FIELD MEASUREMENTS

- A. Verify all measurements in the field.
- B. Verify all field conditions.

## 1.7 COORDINATION

- A. Coordinate the work with plumbing, mechanical and electrical rough-in, installation of associated and adjacent components.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Lumber: Sound, thoroughly seasoned and manufactured in compliance with NFPA "National Design Specification" for Stress Grade Lumber and its Fastenings. Conform to PS-20. Manufacture lumber to comply with applicable grading rules of Southern Pine Inspection Bureau (SPIB).
  - 1. All Wood: Southern Yellow Pine (SPIB), #2 grade or better, kiln dried, KD-15,
  - 2. All lumber (each piece) shall be grade marked and trade marked by accredited test agency.
  - 3. Moisture Content: Kiln dried to maximum 15%.
  - 4. Surfacing: S4S
  - 5. Twisted, bent or warped lumber shall be rejected.
  - 6. Dimensions on drawings: nominal unless noted as actual.
  - 7. Grade Stamp: Factory mark each piece of lumber with the SPIB grade stamp evidencing compliance with the grading rules requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

- B. Plywood: PS 1, APA rated, Exterior Grade, Structural 1, trade marked EXT - APA constructed with moisture resistant glue, grade CDX, unsanded, veneer core. Thickness as indicated on drawings or as indicated herein.
  - 1. Factory mark each panel with APA trademark evidencing compliance with grade requirements.
  - 2. Wall sheathing: 5/8 inch exterior grade plywood with galvanized screws into wood framing. Install plywood wall sheathing at all exterior wall surfaces continuous from the bottom of the sill plate to the top of the top plate at the roof framing and continuous from corner to corner. Maintain continuous at offsets and corners. Securely fasten sheathing to sill track and top track. Double the fasteners at all locations within 8 feet of an inside or outside corner.
- C. Wood I Joists: TJI I-level Commercial Series or Boise Cascade. All products in accordance with ICC ES ESR-1153. Complete shop drawings and calculations bearing the seal of a LA Civil Engineer shall be submitted for approval prior to construction. Maximum deflection of L/480 for Live Load and L/240 for Total Load.
- D. Pressure Treated Plywood: PS 1, APA rated, Exterior Grade, Structural 1, trade marked EXT – APA constructed with moisture resistant glue, grade A – C plugged, veneer core
- E. Wood and Plywood Treatment - Preservative pressure treatment: AWWA Standard U1 (Category UC1, UC@, UC3A, UC3B, UC4A, UC4B) and T1 waterborne Alkaline Copper Quaternary (ACQ) containing no arsenic and no chromium. Comply with NES Report No. NER-643, ICBO ES ER-4981 and International Building Code 2000 requirements for insect and decay preservative treated wood. 0.40 pounds per cubic foot retainage minimum. Preserve by Chemical Specialties, Inc. or equal.
  - 1. Brush all field cuts and drilled holes with two coats preservative used in pressure treatment in accordance with AWWA Standard M4. Conform to manufacturer's instructions
  - 2. Treat southern pine No. 2 for all treated lumber applications. Lumber re-dried to moisture content of 19%, marked DRY.
  - 3. Verify treated lumber is fully compatible with asphalt and all components of the roofing system, the flashing systems, and the fasteners used to install the treated lumber.

## 2.2 ACCESSORY MATERIALS

- A. Provide size, quantity and type fasteners and anchors indicated. If not indicated, provide as recommended by applicable standards and codes and as recommended by manufacturer. Verify that all fasteners and accessory materials used with pressure treated wood are compatible with the treatment.
- B. Nails, Spikes, and Staples and Miscellaneous Fasteners: Hot dip galvanized steel with documented compatibility with ACQ treated lumber or Series 300 stainless steel for all exterior locations, all interior locations, high humidity locations, salt spray locations, for all treated wood, for all wood above roof deck level, and where indicated on drawings. All fasteners used in treated wood shall be approved by the ACQ preservative manufacturer. Do not use aluminum or mild steel fasteners or accessories. All nail sizes and types shall conform to the International Building Code 2006 and this specification, whichever is more stringent.
- C. Bolts, Nuts, Washers, Lag Bolts, Toggle Bolts, Pins, Screws, Expansion Shields, Joist Hanger, Hurricane Clips, Framing Clips, and similar rough hardware: Hot Dipped Galvanized Steel in all locations, sized as noted on drawings or sized to suit application if not noted, for all locations. All bolts, nuts, washers and screws, etc. at all locations in and above the wood roof deck shall be 300 Series stainless steel. All fasteners used in treated wood shall be approved by the wood treatment manufacturer.
- D. Rough Hardware Standards:
  - 1. Bolts: FS FF-B575, ASTM A 687, ANSI B18.2.1, ANSI B18.2.2, ANSI B18.5.
  - 2. Nuts: FS FF-N-836, Washers: FS FF-W-92
  - 3. Lag Screws and Bolts: FS FF-B-561, ANSI B18.2.1.
  - 4. Toggle Bolts: FS FF-B-588.

5. Wood Screws: FS FF-S-111.
  6. Nails and staples: FS FF-N-105, SPA Standards apply for fasteners.
  7. Tacks: FS FF-N-103
  8. Expansion Shields: FS FF-S-325.
  9. Bar or strap anchors: ASTM A575 carbon steel.
- E. Expansion shield and lag bolt type anchors for anchorage to masonry or concrete. Bolt or ballistic fasteners for anchorage to steel.
- F. Adhesive: 3M #5230 or approved equal, waterproof.
- G. Water Resistant Barrier System at walls: Asphalt Felt Underlayment: ASTM D 4869 Type I, asphalt saturated felt, 30 lbs, non-perforated. Provide at all plywood sheathed walls. Install with special felt paper nails, ringed shank, corrosion resistant coated with oversized plastic washer. Wrap corners.  
Coordinate with Section 07 27 26 "Fluid-Applied Membrane Air Barriers."

### **PART 3 - EXECUTION**

#### **3.1 INSPECTION**

- A. Examine the areas and conditions under which the Work of this Section will be performed. Verify that field conditions and the status of work is ready to allow the work of this Section to proceed. Verify that all plumbing, electrical, etc. rough-ins are complete and properly located. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected to the satisfaction of the Installer. Verify field measurements. Beginning of installation indicates acceptance of existing conditions.
- B. Discard materials with defects or damage that might impair quality of work or structural performance, or might impair the quality of subsequent work to be applied to the work of this Section.

#### **3.2 FIELD WOOD TREATMENT**

- A. Brush apply 2 coats of preservative treatment to all field cut pressure treated material. Brushed on preservative to match the preservative used in the pressure treatment. Special care shall be taken to properly field apply preservative to all wood in contact with cementitious materials or the roofing system and related metal flashing. Apply preservative treatment in accordance with manufacturer's recommendations. Insure site-sawn ends are adequately treated. Allow field applied preservative to cure prior to placing members.

#### **3.3 INSTALLATION**

- A. Install wood framing and miscellaneous blocking, furring, cants, nailers, grounds, framing and sheathing. Coordinate with work of other Sections to allow proper attachments. Install members true to lines and levels, plumb, accurately fitted, straight and square. Do not deviate from true alignment more than 1/4 inch. Secure rigidly in place. Place horizontal members laid flat, crown side up.
1. All lumber shall be fitted and connected as required to develop and utilize the full strength capacity of each member.
  2. Secure all doubled, tripled and quadrupled members together. All built up beams shall be glued and nailed or, if indicated on drawings, bolted. Glue shall be 3M 5230 or approved equal.
  3. All lumber and plywood shall be maximum 15% moisture content by weight unless specified to be a lower moisture content.

- B. Construct members of continuous pieces of longest possible lengths. Do not splice any structural members between supports.
- C. Install stripping and nailing member with closure strips at all edges and openings.
- D. Discard units of material with defects which might impair the quality of the Work. Remove and replace all split lumber.
- E. Install all metal fastenings and connectors as shown on drawings, specified, or required for proper installation and as required by recognized standards.
- F. Nails, spikes, screws, bolts, and similar items shall be of sizes and types to draw and rigidly secure members in place. Anchor and nail to comply with "Recommended Nailing Schedule - Table 1" of "Manual for House Framing" and other recommendations of NFPA. Masonry/concrete anchors shall be minimum 5/8" diameter, 3'-0" o.c. maximum spacing or as indicated on drawings, minimum two bolts per member. Spacing of fasteners shall comply with the International Building Code 2000 and this specification, whichever is more stringent. Use nailing machines and power hammers according to manufacturer's instructions.
- G. Cut wood members square, closely fitted, set accurately to required lines and levels and rigidly secure in place. Do not use shims for leveling sill plates, point or grout with non shrink high strength waterproof cement for continuous solid bearing.
- H. Shim, scribe and cope carpentry to fit to other work and to existing surfaces for accurate fit. Maximum gap 1/32 inch at abutting components.
- I. Verify all inserts, pipes, anchors, etc.
- J. Cut, fit and/or patch Work as required in connection with other trades which adjoin any part of this Work, leaving all Work included herein complete after other trades have completed their Work.
- K. Securely attach all carpentry work to substrates.
- L. Counter sink nail heads on exposed carpentry work and nailers associated with the roofing and flashing systems. Use common wire nails for concealed work, except as otherwise indicated. Countersink bolt heads and nuts flush with surfaces.
- M. Install fasteners without splitting of wood; pre-drill as required. Remove and replace all split wood.
- N. Remove and replace all warped and twisted wood.
- O. All wood in contact with the concrete, masonry, or metal deck is to be preservative pressure treated. All wood associated with or within the roofing systems and flashing systems shall be pressure treated.
- P. Provide all grounds, blocking, nailers, and bracing required for subsequent work that will be attached to and/or supported by framed walls, ceilings, and floors. Provide proper anchorage for all other trades. Coordinate locations of furring, nailers, blocking, grounds, bracing, and similar supports to allow attachment of other work.
- Q. Provide joints and connectors at non-wood construction to allow for shrinkage, expansion and other movement of the wood. Provide clearances between framing and other construction that may be subject to differential movement.
- R. Retighten all bolts prior to installation of subsequent materials.

### 3.4 SHEATHING

- A. Comply with applicable recommendations in Form No. E 30F "APA Design/Construction Guide - Residential and Commercial" for types of sheathing and decking indicated. All sheathing and decking panels shall be installed to two span continuous minimum.
- B. Secure plywood wall sheathing horizontally to wall studs with ends staggered. Secure sheet edges over firm bearing. Unless otherwise indicated, fasten plywood wall sheathing to metal framing with #12 hot dipped galvanized screws at 6 inches on center maximum spacing along all panel edges and 12 inches on center maximum spacing along all intermediate supports. Fasten to all framing members in this manner including, but not limited to studs, plates, bracing, and corner posts. Fasten plywood wall sheathing to metal framing with #12 hot dipped galvanized screws at 3 inches on center maximum spacing along all panel edges and 6 inches on center maximum spacing along all intermediate supports within 12 feet of an inside or outside wall corner. Securely fasten sheathing to sill tracks and top tracks in all locations.
  - 1. All exterior framed walls shall have plywood sheathing installed from the bottom of the sill plate to the top of the top plate at the intersection with the roof framing and continuous from corner to corner.
  - 2. Surface of all plywood sheathing shall be as required to properly receive the water resistive barrier system (30 lb felt paper).
  - 3. Install felt paper water resistive barrier system shingle style starting at the bottom of the wall. Minimum 6 inch overlap and minimum 6 inch side laps. Seal side laps. Provide minimum one (1) felt paper fastener per 2 square feet of wall surface plus at 8 inches on center along the top edge of each course.

### 3.5 TEMPORARY WORK

- A. Protect completed woodwork and other surfaces exposed to possible damage with adequate temporary coverings.
- B. Provide temporary stairs, ramps, runways, railings, guards, and ladders as required for the purpose of safe handling of materials, safe personnel access to work, and safe temporary exits from building.

### 3.6 CLEANING

- A. Clean work area at the end of each days work. Do not allow trash, debris or surplus materials to accumulate on site.
- B. Leave site clean, remove all debris created by the work of this Section upon completion of the work of this Section.

### 3.7 PROTECTION OF FINISHED WORK

- A. Protect finished Work as needed.
- B. Protect the work of all other Sections from damage due to work of this Section.

**END OF SECTION 06 10 00**



## SECTION 06 16 00 - SHEATHING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Wall sheathing.
  - 2. Roof sheathing.
- B. Related Requirements:
  - 1. Section 06 10 00 "Rough Carpentry" for plywood backing panels.
  - 2. Section 07 27 26 "Fluid-Applied Membrane Air Barriers" for water-resistive barrier applied over wall sheathing.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
  - 2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
  - 3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For following products, from ICC-ES:
  - 1. Preservative-treated plywood.

#### 1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

## 1.6 DELIVERY, STORAGE, AND HANDLING

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

## PART 2 - PRODUCTS

### 2.1 WOOD PANEL PRODUCTS

- A. Plywood: Either DOC PS 1 or DOC PS 2 unless otherwise indicated.
- B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- C. Factory mark panels to indicate compliance with applicable standard.

### 2.2 PRESERVATIVE-TREATED PLYWOOD

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

### 2.3 WALL SHEATHING

- A. Plywood Wall Sheathing: Exterior, Structural I sheathing.
  - 1. Span Rating: Not less than 32/16.
  - 2. Nominal Thickness: Not less than 5/8 inch (16 mm).

### 2.4 ROOF SHEATHING

- A. Plywood Roof and Interior Shear Wall Sheathing: Exterior, Structural I sheathing.
  - 1. Span Rating: Not less than 32/16.
  - 2. Nominal Thickness: Not less than 5/8 inch (16 mm).

### 2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. For roof and interior shear wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

2. For exterior wall sheathing, provide fasteners of Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
  1. NES NER-272 for power-driven fasteners.
  2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
- D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.
- E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

### 3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
  1. Wall and Roof Sheathing:
    - a. Nail to wood framing. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.
    - b. Screw to cold-formed metal framing.
    - c. Space panels 3 mm (1/8 inch) apart at edges and ends.

END OF SECTION 06 16 00



## SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Plastic-laminate cabinets.
  - 2. Plastic-laminate countertops.
  - 3. Plastic-laminate faced shelving on adjustable standards.
  - 4. Casework hardware.
  - 5. Wood trim and mouldings.
  - 6. Interior standing and running trim.
  - 7. Work Counters.
- B. Related Sections include the following:
  - 1. Section 06 10 00 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.
  - 2. Section 08 14 16 "Flush Wood Doors."

#### 1.3 DEFINITIONS

- A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated, including cabinet hardware and accessories.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
  - 1. Show details full size.
  - 2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
  - 3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets and other items installed in architectural woodwork.
- C. Samples for Initial Selection:
  - 1. Plastic laminates.
  - 2. Shop applied transparent finishes.
  - 3. Thermoset decorative overlays
- D. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates are not required, but AWI quality standards are to be followed.

## 1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: An experienced installer who has completed architectural woodwork similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

## 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.
  - 2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

## 1.8 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Provide materials that comply with requirements of AWI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated. All materials, fabrication, and installation shall be in accordance with AWI premium standards.
- B. Wood Products: Comply with the following:
  - 1. Softwood Plywood: Exterior type, A-C Plugged, conforming to Product Standard PSI and American Plywood Association (APA).

- C. High-Pressure Decorative Laminates: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.
1. Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates (multiple selections) by the following, as indicated on the drawings:
    - a. Formica Corporation.
    - b. Nevamar Company, LLC; Decorative Products Div.
    - c. Wilsonart International; Div. of Premark International, Inc.
    - d. Pionite Corporation.

## 2.2 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets.
- B. Paragraphs and subparagraphs below describing hardware items are examples only; edit to suit Project. Delete if schedule is included on Drawings.
- C. Frameless Concealed Hinges (European Type): BHMA 156.9,B01602, 100 degrees of opening.
- D. Wire Pulls: Back mounted, 4 inch long, 5/16" diameter, satin chrome wire type pull. First option in paragraph below specifies standards and clip-type rests for mounting at ends of shelves; second specifies standards and knife-type brackets for mounting at rear of shelves.
- E. Adjustable Shelves: KV steel standards with metal supports. Types for inside cabinets and on walls. At wall standards, provide KV safety heavy-duty steel shelf brackets with cam locks, and screw fasteners into shelf bottoms.
- F. Door Locks (At all cabinet doors and drawers):
1. Hafele 21002095 at double door units.
  2. Hafele 23212311 at single door units.
  3. Hafele 23218312 at drawer units.
- G. Door Catches: Magnetic type.
- H. Drawer Slides: Zinc plated steel, side mounted, full extension, 125 lb. rating. Sizes in first paragraph below are two of the many offered. Other colors, materials, and styles are also available. 1-1/4-inch (32-mm) grommet is "OG series"; 2-inch (51-mm) grommet is "SG series."
- I. Grommets for Cable Passage through Countertops: 2-inch black, molded-plastic grommets and matching plastic caps with slot for wire passage.
- J. Exposed Hardware Finishes: Satin Chrome.
- K. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.
- L. For all doors and drawers provide mutes.

## 2.3 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.

- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.
- C. Adhesives, General: Do not use adhesives that contain urea formaldehyde.
- D. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
  - 1. Wood Glues: 30 g/L.
  - 2. Contact Adhesive: 250 g/L.

## 2.4 FABRICATION, GENERAL

- A. Interior Woodwork Grade: Unless otherwise indicated, provide Premium-grade interior woodwork complying with referenced quality standard.
- B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
- C. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
  - 1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch (19 mm) Thick or Less: 1/16 inch (1.5 mm).
  - 2. Edges of Rails and Similar Members More Than 3/4 Inch (19 mm) Thick: 1/8 inch (3 mm).
- D. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- E. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
  - 1. Seal edges of openings in countertops with a coat of varnish.

## 2.5 INTERIOR STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH

- A. Quality Standard: Comply with AWI Section 300.
- B. For trim items wider than available lumber, used veneered construction. Do not glue for width or thickness.
- C. For rails wider or thicker than available lumber, used veneered construction. Do not glue for width or thickness.
- D. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.
- E. Assemble moldings in plant to maximum extent possible. Mitre corners in plant and prepare for field assembly with bolted fittings designed to pull connections together.

## 2.6 PLASTIC-LAMINATE CABINETS

- A. Quality Standard: Comply with AWI Section 400 requirements for laminate cabinets (Custom Grade).
- B. AWI Type of Cabinet Construction: Flush Overlay, or as indicated on drawings.

- C. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
1. Horizontal Surfaces Other Than Tops: Grade HGS.
  2. Vertical Surfaces: Grade VGS.
  3. Edges: Grade HGS.
  4. Substrate: Exterior grade plywood.
- D. Materials for Semiexposed Surfaces: Provide surface materials indicated below:
1. Surfaces Other Than Drawer Bodies: Thermoset Decorative Overlay.
    - a. Shelving Including Edges: Thermoset Decorative Overlay.
    - b. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, Grade VGS.
  2. Drawer Sides and Backs: Solid-hardwood lumber factory finished.
  3. Drawer Bottoms: Hardwood plywood factory finished.
  4. Interiors of all cabinets, drawers, and casework with doors: Thermoset Decorative Overlay, color to be selected.
- E. Concealed Backs of Panels with Exposed Plastic Laminate Surfaces: High-pressure decorative laminate, Grade BKL.

## 2.7 PLASTIC-LAMINATE COUNTERTOPS

- A. Quality Standard: Comply with AWI Section 400 requirements for laminate cabinets.
- B. High-Pressure Decorative Laminate Grade: HGS.
- C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. As indicated by manufacturer's designations.
  2. Match Architect's sample.
  3. As selected by Architect from manufacturer's full range in the following categories:
    - a. Solid colors, matte finish.
    - b. Solid colors with core same color as surface, matte finish.
    - c. Wood grains, matte finish.
    - d. Patterns, matte finish.
- D. Grain Direction: Parallel to cabinet fronts.
- E. Edge Treatment: Same as laminate cladding on horizontal surfaces.
- F. Core Material:  $\frac{3}{4}$ " thick exterior-grade plywood. Double layer plywood at counter fronts.

## 2.9 SHOP FINISHING

- A. Quality Standard: Comply with AWI Section 1500, unless otherwise indicated.
1. Grade: Provide finishes of same grades as items to be finished.
- B. General: Shop finish transparent finished interior architectural woodwork at fabrication shop as specified in this Section.

1. Standing and running trim indicated as "Wood Base" on the drawings.
- A. Preparations for finishing: Comply with referenced quality standard for sanding, filling, countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
  1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and to end-grain surfaces. Concealed surfaces of plastic laminate clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative overlay.
- D. Transparent Finish: Comply with requirements indicated below for grade, finish system, staining, and sheen with sheen measured on 30 to 50 degree gloss meter per ASTM D 523.
  1. AWI Finish System TR-2: Catalyzed lacquer or;
  2. AWI Finish System TR-3: Water- reducible acrylic lacquer.
    - a. To be selected by the Architect from submittals of both of the above.
  3. Staining: Match Architects sample.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.
- B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

#### 3.2 INSTALLATION

- A. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in Part 2 of this Section for type of woodwork involved.
- B. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.
- C. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- E. Standing and running trim: Install with minimum number of joints possible, using full length pieces (from maximum length of lumber available) to greatest extent possible.
  1. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base if finished.
  2. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches.
- F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
  1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.

2. Maintain veneer sequence matching of cabinets with transparent finish.
  3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c.
- G. Cabinets: Install owner furnished metal cabinets so all doors and drawers are plumb and aligned.
- H. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
1. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
  2. Secure backsplashes to tops with concealed metal brackets at 16 inches o.c.
  3. Caulk space between backsplash and wall with sealant specified in Division 7 Section "Joint Sealants."
- I. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

### 3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

**END OF SECTION 06 40 23**



## SECTION 06 64 00 - PLASTIC PANELING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Plastic sheet paneling, adhered to gypsum board walls.
- B. Related Requirements:
  - 1. Section 09 29 00 "Gypsum Board" for installing plastic paneling.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For plastic paneling and trim accessories, in manufacturer's standard sizes.

#### 1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install plastic paneling until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain plastic paneling and trim accessories from single manufacturer.

#### 2.2 PLASTIC SHEET PANELING

- A. Glass-Fiber-Reinforced Plastic Paneling: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D 5319.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Crane Composites, Inc.

- b. Glasteel.
  - c. Marlite.
2. Surface-Burning Characteristics: As follows when tested by a qualified testing agency according to ASTM E 84. Identify products with appropriate markings of applicable testing agency.
- a. Flame-Spread Index: 25 or less.
  - b. Smoke-Developed Index: 450 or less.
3. Nominal Thickness: Not less than 3.0 mm (0.12 inch).
4. Surface Finish: Molded pebble texture.
5. Color: As selected by Architect from manufacturer's full range.

### 2.3 ACCESSORIES

- A. Trim Accessories: Manufacturer's standard two-piece, snap-on vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.
- 1. Color: Match panels.
- B. Exposed Fasteners: Nylon drive rivets recommended by panel manufacturer.
- C. Concealed Mounting Splines: Continuous, H-shaped aluminum extrusions designed to fit into grooves routed in edges of factory-laminated panels and to be fastened to substrate.
- D. Adhesive: As recommended by plastic paneling manufacturer and with a VOC content of 50 g/L or less.
- E. Sealant: Mildew-resistant, single-component, neutral-curing or acid-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 07 92 00 "Joint Sealants."

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove wallpaper, vinyl wall covering, loose or soluble paint, and other materials that might interfere with adhesive bond.
- B. Prepare substrate by sanding high spots and filling low spots as needed to provide flat, even surface for panel installation.
- C. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.
- D. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.

- E. Lay out paneling before installing. Locate panel joints so that trimmed panels at corners are not less than 300 mm (12 inches) wide.
  - 1. Mark plumb lines on substrate at trim accessory locations for accurate installation.
  - 2. Locate trim accessories to allow clearance at panel edges according to manufacturer's written instructions.

### 3.3 INSTALLATION

- A. Install plastic paneling according to manufacturer's written instructions.
- B. Install panels in a full spread of adhesive.
- C. Install trim accessories with adhesive and nails or staples. Do not fasten through panels.
- D. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.
- E. Maintain uniform space between panels and wall fixtures. Fill space with sealant.
- F. Maintain uniform space between adjacent panels and between panels and floors, ceilings, and fixtures. Fill space with sealant.
- G. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

END OF SECTION 06 64 00



## SECTION 07 21 00 - THERMAL INSULATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Glass-fiber blanket insulation at all exterior walls.
  - 2. Spray polyurethane foam insulation at roof joists.
  - 3. Radiant barriers at spray foam insulation.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.
- B. Research/Evaluation Reports: For foam-plastic insulation, from ICC-ES.

#### 1.5 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

### PART 2 - PRODUCTS

#### 2.1 GLASS-FIBER BLANKET INSULATION

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. CertainTeed Corporation.
  2. Guardian Building Products, Inc.
  3. Johns Manville.
  4. Knauf Insulation.
  5. Owens Corning.
- B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
- C. Thicknesses: As indicated on drawings, or 5-1/2." Minimum R21.

## 2.2 SPRAY POLYURETHANE FOAM INSULATION

- A. Open-Cell Polyurethane Foam Insulation: Spray-applied low density polyurethane foam using water as a blowing agent, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. BaySystems NorthAmerica, LLC.
    - b. Demilec (USA) LLC.
    - c. Gaco Western Inc.
    - d. Icynene Inc.
    - e. SWD Urethane Company.
  2. Minimum density of 6.4 kg/cu. m (0.4 lb/cu. ft.), thermal resistivity of 24 K x m/W at 24 deg C (3.4 deg F x h x sq. ft./Btu x in. at 75 deg F).
- B. Radiant Barrier: Coat exposed surfaces of spray foam insulation with intumescent paint or other coating in compliance with IBC codes for use of spray foam insulation in roof framing.

## 2.3 WATER BASED FIRE PROTECTION

- A. Spray applied material approved as a flame barrier for use without a thermal barrier complying with IBC 803.2.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation or that interfere with insulation attachment.

### 3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

### 3.3 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Glass-Fiber Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
  - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
  - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  - 3. For metal-framed wall cavities where cavity heights exceed 2438 mm (96 inches), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
- C. Spray-Applied Insulation: Apply spray-applied insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical work is completed, and electrical boxes and other items not indicated to receive insulation are masked. After insulation is applied, make flush with face of joists by using method recommended by insulation manufacturer. Coat with code-compliant radiant barrier coating.
- D. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
  - 1. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

### 3.4 INSTALLATION OF INSULATION IN CEILINGS FOR SOUND ATTENUATION

- A. Where glass-fiber blankets are indicated for sound attenuation above ceilings, install blanket insulation over entire ceiling area in thicknesses indicated. Extend insulation 1219 mm (48 inches) up either side of partitions.

### 3.5 INSTALLATION OF WATER BASED FIRE PROTECTION

- A. Upon completion of spray applied insulation, spray apply water based fire protection material in accordance with manufacturer's instructions..

### 3.6 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

### 3.7 INSULATION SCHEDULE

- A. Insulation Type 1: Unfaced, glass-fiber blanket insulation.

- B. Insulation Type 2: Polyurethane spray foam insulation (at roof) with applied radiant barrier coating.

**END OF SECTION 07 21 00**

## SECTION 07 27 26 - FLUID-APPLIED MEMBRANE AIR BARRIERS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes fluid-applied, vapor-permeable membrane air barriers for exterior walls.
- B. Related Requirements:
  - 1. Division 06 Section "Sheathing" for wall sheathings and wall sheathing joint-and-penetration treatments.

#### 1.3 DEFINITIONS

- A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.
- B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.
- C. Air-Barrier Assembly: The collection of air-barrier materials and accessory materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

#### 1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of products.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.
- C. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.

**1.7 QUALITY ASSURANCE**

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

**1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- B. Protect stored materials from direct sunlight.

**1.9 FIELD CONDITIONS**

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air-barrier manufacturer.
  - 1. Protect substrates from environmental conditions that affect air-barrier performance.
  - 2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

**PART 2 - PRODUCTS****2.1 MATERIALS, GENERAL**

- A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.
- B. VOC Content: 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and complying with VOC content limits of authorities having jurisdiction.

**2.2 PERFORMANCE REQUIREMENTS**

- A. General: Air barrier shall be capable of performing as a continuous vapor- permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. Air-Barrier Assembly Air Leakage: Maximum 0.2 L/s x sq. m of surface area at 75 Pa (0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft.), when tested according to ASTM E 283, ASTM E 783 or ASTM E 2357 .

**2.3 VAPOR-PERMEABLE MEMBRANE AIR-BARRIER**

- A. Fluid-Applied, Vapor-Permeable Membrane Air Barrier: synthetic polymer membrane.
  - 1. Products: Subject to compliance with requirements, provide one of the following, or approve equal:
    - a. Synthetic Polymer Membrane:
      - 1) Carlisle Coatings & Waterproofing Inc.; Barritech VP.
      - 2) Grace, W. R., & Co. - Conn.; Perm-A-Barrier VP.

## 3) Henry Company; Air-Bloc 33.

## 2. Physical and Performance Properties:

- a. Air Permeance: Maximum 0.02 L/s x sq. m of surface area at 75-Pa (0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft.) pressure difference; ASTM E 2178.
- b. Vapor Permeance: Minimum 10 perms (580 ng/Pa x s x sq. m); ASTM E 96/E 96M.
- c. Ultimate Elongation: Minimum 200 percent; ASTM D 412, Die C.

**2.4 ACCESSORY MATERIALS**

- A. General: Accessory materials recommended by air-barrier manufacturer to produce a complete air-barrier assembly and compatible with primary air-barrier material.
- B. Primer: Liquid waterborne primer recommended for substrate by air-barrier material manufacturer.
- C. Counterflashing Strip: Modified bituminous, 1.0-mm- (40-mil-) thick, self-adhering sheet consisting of 0.8 mm (32 mils) of rubberized asphalt laminated to an 0.2-mm- (8-mil-) thick, cross-laminated polyethylene film with release liner backing.
- D. Butyl Strip: Vapor retarding, 0.76 to 1.0 mm (30 to 40 mils) thick, self-adhering; polyethylene-film-reinforced top surface laminated to layer of butyl adhesive with release liner backing.
- E. Modified Bituminous Strip: Vapor retarding, 1.0 mm (40 mils) thick, smooth surfaced, self-adhering; consisting of 0.9 mm (36 mils) of rubberized asphalt laminated to a 0.1-mm- (4-mil-) thick polyethylene film with release liner backing.
- F. Joint Reinforcing Strip: Air-barrier manufacturer's glass-fiber-mesh tape.
- G. Substrate-Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
- H. Adhesive and Tape: Air-barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.
- I. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, [0.64 mm (0.0250 inch)] thick, and Series 300 stainless-steel fasteners.
- J. Sprayed Polyurethane Foam Sealant: One- or two-component, foamed-in-place, polyurethane foam sealant, 24- to 32-kg/cu. m (1.5- to 2.0-lb/cu. ft) density; flame-spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
- K. Modified Bituminous Transition Strip: Vapor retarding, 1.0 mm (40 mils) thick, smooth surfaced, self-adhering; consisting of 0.9 mm (36 mils) of rubberized asphalt laminated to a 0.1-mm- (4-mil-) thick polyethylene film with release liner backing.
- L. Adhesive-Coated Transition Strip: Vapor-permeable, 0.43-mm- (17-mil-) thick, self-adhering strip consisting of an adhesive coating over a permeable laminate with a permeance value of 37 perms (2145 ng/Pa x s x sq. m).
- M. Elastomeric Flashing Sheet: ASTM D 2000, minimum 1.3- to 1.6-mm- (50- to 65-mil-) thick, cured sheet neoprene with manufacturer-recommended contact adhesives and lap sealant with [stainless-steel termination bars and fasteners] .
- N. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Division 07 Section "Joint Sealants."
- O. Termination Mastic: Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
  - 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
  - 2. Verify that concrete has cured and aged for minimum time period recommended by air-barrier manufacturer.
  - 3. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
  - 4. Verify that masonry joints are flush and completely filled with mortar.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 SURFACE PREPARATION

- A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air-barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.
- E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

### 3.3 JOINT TREATMENT

- A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C 1193 and air-barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D 4258 before coating surfaces.
  - 1. Prime substrate and apply a single thickness of air-barrier manufacturer's recommended preparation coat extending a minimum of 75 mm (3 inches) along each side of joints and cracks. Apply a double thickness of fluid air-barrier material and embed a joint reinforcing strip in preparation coat.
- B. Gypsum Sheathing: Fill joints greater than 6 mm (1/4 inch) with sealant according to ASTM C 1193 and air-barrier manufacturer's written instructions. Apply first layer of fluid air-barrier material at joints. Tape joints with joint reinforcing strip after first layer is dry. Apply a second layer of fluid air-barrier material over joint reinforcing strip.

### 3.4 TRANSITION STRIP INSTALLATION

- A. General: Install strips, transition strips, and accessory materials according to air-barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.
  - 1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
  - 2. Install butyl strip on roofing membrane or base flashing so that a minimum of 75 mm (3 inches) of coverage is achieved over each substrate.
- B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by fluid air-barrier material on same day. Reprime areas exposed for more than 24 hours.
  - 1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- C. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- D. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.
- E. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply adhesive-coated transition strip so that a minimum of 75 mm (3 inches) of coverage is achieved over each substrate. Maintain 75 mm (3 inches) of full contact over firm bearing to perimeter frames with not less than 25 mm (1 inch) of full contact.
  - 1. Adhesive-Coated Transition Strip: Roll firmly to enhance adhesion.
- G. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.
- H. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.
- I. Seal top of through-wall flashings to air barrier with an additional 150-mm- (6-inch-) wide, modified bituminous strip.
- J. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- K. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 150 mm (6 inches) beyond repaired areas in strip direction.

### 3.5 FLUID AIR-BARRIER MEMBRANE INSTALLATION

- A. General: Apply fluid air-barrier material to form a seal with strips and transition strips and to achieve a continuous air barrier according to air-barrier manufacturer's written instructions. Apply fluid air-barrier material within manufacturer's recommended application temperature ranges.
  - 1. Apply primer to substrates at required rate and allow it to dry.
  - 2. Limit priming to areas that will be covered by fluid air-barrier material on same day. Reprime areas exposed for more than 24 hours.

3. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- B. Membrane Air Barriers: Apply a continuous unbroken air-barrier membrane to substrates according to the following thickness. Apply air-barrier membrane in full contact around protrusions such as masonry ties.
  1. Vapor-Permeable Membrane Air Barrier: Total, applied in.
- C. Apply strip and transition strip over cured air-barrier material overlapping 75 mm (3 inches) onto each surface according to air-barrier manufacturer's written instructions.
- D. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.
- E. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

### 3.6 FIELD QUALITY CONTROL

- A. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
  1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
  2. Continuous structural support of air-barrier system has been provided.
  3. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
  4. Site conditions for application temperature and dryness of substrates have been maintained.
  5. Maximum exposure time of materials to UV deterioration has not been exceeded.
  6. Surfaces have been primed, if applicable.
  7. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
  8. Termination mastic has been applied on cut edges.
  9. Strips and transition strips have been firmly adhered to substrate.
  10. Compatible materials have been used.
  11. Transitions at changes in direction and structural support at gaps have been provided.
  12. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
  13. All penetrations have been sealed.
- B. Air barriers will be considered defective if they do not pass inspections.
  1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
  2. Remove and replace deficient air-barrier components for retesting as specified above.
- C. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

### 3.7 CLEANING AND PROTECTION

- A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
  1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. If exposed to these conditions for more than 60 days, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed membrane according to air-barrier manufacturer's written instructions.

2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.
- B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.
- C. Remove masking materials after installation.

**END OF SECTION 07 27 26**



## SECTION 07 46 46 - FIBER-CEMENT SIDING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes fiber-cement siding and trim.
- B. Related Requirements:
  - 1. Section 06 10 00 "Rough Carpentry" for wood furring, grounds, nailers, and blocking.
  - 2. Section 06 16 00 "Sheathing" for exterior wall sheathing.
  - 3. Section 07 27 26 "Fluid-Applied Membrane Air Barriers" for weather-resistive barriers.
  - 4. Section 07 62 00 "Sheet Metal Flashings and Trim" for flashings.

#### 1.3 COORDINATION

- A. Coordinate siding installation with flashings and other adjoining construction to ensure proper sequencing.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples for Initial Selection: For fiber-cement siding and trim, including related accessories.
- C. Samples for Verification: For each type, color, texture, and pattern required.
  - 1. 300-mm- (12-inch-) long-by-actual-width Sample of siding.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of fiber-cement siding and trim.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fiber-cement siding.
- C. Research/Evaluation Reports: For each type of fiber-cement siding required, from ICC-ES.
- D. Sample Warranty: For special warranty.

## 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of product, including related accessories, to include in maintenance manuals.

## 1.7 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for fabrication and installation.
  - 1. Build mockup of typical wall area as shown on Drawings, including studs, sheathing, air barrier, flashings, siding, and trim (unpainted).
    - a. Size: 1200 mm (48 inches) long by 1800 mm (60 inches) high.
    - b. Include outside corner on one end of mockup.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with labels intact until time of use.
- B. Store materials on elevated platforms, under cover, and in a dry location.

## 1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace products that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including cracking, warping, and deforming.
    - b. Deterioration of materials beyond normal weathering.
    - c. Fastener migration.
  - 2. Warranty Period: 25 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 FIBER-CEMENT SIDING

- A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CertainTeed Corporation.

- b. GAF Materials Corporation.
  - c. James Hardie Building Products, Inc. (Basis of design).
  - d. Nichiha Fiber Cement.
- B. Source Limitations: Obtain products, including related accessories, from single source from single manufacturer.
- C. Labeling: Provide fiber-cement siding that is tested and labeled according to ASTM C 1186 by a qualified testing agency acceptable to authorities having jurisdiction.
- D. Nominal Thickness: Not less than 8 mm (5/16 inch).
- E. Horizontal Pattern: Boards 133 mm (5-1/4 inches) wide in plain style.
1. Texture: Smooth.
- F. Factory Priming: Manufacturer's standard acrylic primer. All siding boards and trim to also be back-primed.

## 2.2 ACCESSORIES AND TRIM

- A. Siding Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration, and as indicated on the drawings.
1. Provide accessories matching color and texture of adjacent siding unless otherwise indicated.
- B. Decorative Accessories: Provide the following fiber-cement decorative accessories as indicated:
1. Corner posts.
  2. Door and window casings.
  3. Fasciae.
  4. Moldings and trim.
- C. Flashing: Provide flashing complying with Section 07 62 00 "Sheet Metal Flashing and Trim" at window and door heads and where indicated.
- D. Fasteners:
1. For fastening to wood, use ribbed bugle-head screws of sufficient length to penetrate a minimum of 25 mm (1 inch) into substrate.
  2. For fastening fiber cement, use stainless-steel fasteners.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of fiber-cement siding, trim and related accessories.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.

### 3.3 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
  - 1. Do not install damaged components.
  - 2. Backprime all siding components.
  - 3. Center fasteners in elongated nailing slots without binding siding, to allow for thermal movement.
  - 4. Install fasteners no more than 400 mm (16 inches) o.c. All fasteners shall be concealed except at locations where it is not possible. Fill and paint fastener heads where exposed.
- B. Install joint sealants as specified in Section 07 92 00 "Joint Sealants" and to produce a weathertight installation.

### 3.4 ADJUSTING AND CLEANING

- A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.
- B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 07 46 46

## SECTION 07 54 23 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

- A. Submittals: Shop Drawings of insulation and ICC-ES evaluation reports for components of membrane roofing system.
- B. Warranties: Manufacturer's standard form or customized, without monetary limitation, signed by roofing manufacturer agreeing to repair leaks due to defects in materials or workmanship for period of 20 years. Warranty covers all work above existing built-up roof.
- C. Intent is to provide a complete roofing system, including TPO fabric, cover board, insulation, blocking, base sheet (if required), base flashing, and flashing over an existing built-up roof on light-weight concrete and metal deck.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
- B. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.
- C. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E 1980.
- D. Exterior Fire-Test Exposure: ASTM E 108, Class A.

#### 2.2 ROOFING MATERIALS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Carlisle SynTec Incorporated.
  - 2. Firestone Building Products. Basis of design is Firestone UltraPly TPO Membrane, mechanically attached to wood deck system.
  - 3. GAF Materials Corporation.
  - 4. Johns Manville; a Berkshire Hathaway company.
- B. Fabric-Reinforced TPO Sheet: ASTM D 6878, internally fabric- or scrim-reinforced, uniform, flexible, fabric-backed TPO sheet.
  - 1. Thickness: 1.5 mm (60 mils), nominal.
  - 2. Exposed Face Color: White.
- C. Auxiliary Materials: Recommended by roofing system manufacturer for intended use and as follows:

1. Sheet Flashing: Unreinforced TPO sheet flashing, 1.4 mm (55 mils) thick, minimum, of same color as sheet membrane.
2. Bonding Adhesive: Manufacturer's standard.

### 2.3 ROOF INSULATION

- A. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2 or 3.
- B. Fabricate tapered insulation with slope of 1:48 (1/4 inch per 12 inches) unless otherwise indicated.
- C. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, Type X, 6.5 mm (1/4 inch) thick.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CertainTeed Corporation.
    - b. Georgia-Pacific Building Products.
    - c. National Gypsum Company.
    - d. United States Gypsum Company.
- D. Primer: As required by roofing system manufacturer.
- E. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric; water permeable and resistant to UV degradation.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Loosely lay insulation units.
- B. Install cover boards over insulation with long joints continuous and perpendicular to roof slopes with end joints staggered. Loosely butt cover boards together and fasten to deck, through insulation.
- C. Install TPO sheet according to roofing system manufacturer's written instructions and as follows:
  1. Mechanically Fastened Sheet Installation: Secure one edge of sheet using fastening plates or battens centered within the membrane splice, and mechanically fasten sheet to roof deck.
- D. Seams: Clean seam areas, overlap membrane roofing, and hot-air-weld side and end laps of membrane roofing and sheet flashings. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
- E. Spread sealant bed over deck drain flange at roof drains, and securely seal membrane roofing in place with clamping ring.
- F. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- G. Terminate and seal top of sheet flashings under coping, or where coping does not exist, mechanically anchor to substrate through termination bars.

END OF SECTION 07 54 23

## SECTION 07 61 13 - STANDING-SEAM METAL ROOFING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes standing-seam metal roof panels, roof penetration accessories, flashing, downspouts, fascia, soffit material, fasteners, waterproofing membrane, roof sheathing, roof insulation, blocking, and all materials associated with the standing seam roofing system.
- B. The roofing contractor is responsible for all above items as part of the roofing system.

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of roof accessories and roof-mounted equipment.
  - 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
  - 4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
  - 5. Review structural loading limitations of deck during and after roofing.
  - 6. Review flashings, special details, drainage, penetrations, equipment curbs, and condition of other construction that affect metal panels.
  - 7. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
  - 8. Review temporary protection requirements for metal panel systems during and after installation.
  - 9. Review procedures for repair of metal panels damaged after installation.
  - 10. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:

1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
  2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1:10 (1-1/2 inches per 12 inches).
- C. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes.
1. Include similar Samples of trim and accessories involving color selection.
- E. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
1. Metal Panels: 12 inches (305 mm) long by actual panel width. Include clips, fasteners, closures, and other metal panel accessories.

### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- C. Field quality-control reports.
- D. Sample Warranties: For special warranties.

### 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal panels to include in maintenance manuals.

### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.

**1.9 FIELD CONDITIONS**

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

**1.10 COORDINATION**

- A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.
- B. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

**1.11 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal roofing system including insulation, cover board, fasteners, waterproofing membrane, wood blocking, metal panels including all components, that fail in materials or workmanship within specified warranty period, at no cost to the Owner.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including rupturing, cracking, or puncturing.
    - b. Deterioration of metals and other materials beyond normal weathering.
  - 2. Warranty Period: Thirty years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's Warranty in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period, at no cost to the Owner.
  - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: Thirty years from date of Substantial Completion.
- C. Special Weathertightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof system components and assemblies that fail to remain weathertight, including leaks, within specified warranty period, at no cost to the Owner.
  - 1. Warranty Period: Thirty years from date of Substantial Completion.
  - 2. Submit a written no-dollar limit warranty executed by the manufacturer for a period of 30 years from the date of Substantial Completion, wherein the manufacturer ensures that the installer will correct any roof leaks identified within the building beyond normal wear and tear.

**PART 2 - PRODUCTS****2.1 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
  - 1. Wind Loads: As indicated on Drawings.
- B. Windborne-Debris-Impact-Resistance Performance: Provide aluminum-framed systems that pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996.
  - 1. Large-Missile Impact: For standing-seam metal roof systems located within 30 feet (9.1 m) of grade.
- C. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E 1680 at the following test-pressure difference:
  - 1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).
- D. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 1646 at the following test-pressure difference:
  - 1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).
- E. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E 2140.
- F. FM Global Listing: Provide metal roof panels and component materials that comply with requirements in FM Global 4471 as part of a panel roofing system and that are listed in FM Global's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.
  - 1. Fire/Windstorm Classification: Class 1A-150.
  - 2. Hail Resistance: MH.
- G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

**2.2 STANDING-SEAM METAL ROOF PANELS**

- A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.
  - 1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1514.
- B. Vertical-Rib, Seamed-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and a flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and mechanically seaming panels together.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Architectural Building Components.
  - b. Architectural Metal Systems; a Nucor company.
  - c. Berridge Manufacturing Company.
  - d. CENTRIA Architectural Systems.
  - e. Englert, Inc.
  - f. Fabral.
  - g. MBCI; a division of NCI Building Systems, L.P.
  - h. Merchant & Evans.
  - i. Metal Sales Manufacturing Corporation.
  - j. Morin; a Kingspan Group company.
  - k. Petersen Aluminum Corporation.
2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
  - a. Nominal Thickness: As required for structural requirements..
  - b. Exterior Finish: Two-coat fluoropolymer.
  - c. Color: As selected by Architect from manufacturer's full range.
3. Clips: Two-piece floating to accommodate thermal movement.
  - a. Material: 0.062-inch- (1.59-mm-) thick, stainless-steel sheet.
4. Joint Type: Double folded, 180°.
5. Panel Coverage: 12 inches (305 mm)
6. Panel Height: 2.0 inches( 51 mm).
7. Panel Lengths: Panels shall run full length from eave to ridge. No transverse joints will be allowed.

### 2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils (0.76 mm) thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.
  1. Thermal Stability: Stable after testing at 240 deg F (116 deg C); ASTM D 1970.
  2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.
  3. Products: Subject to compliance with requirements, provide one of the following:
    - a. Carlisle Residential, a division of Carlisle Construction Materials; WIP 300HT.
    - b. Grace Construction Products, a unit of W. R. Grace & Co.; Grace Ice and Water Shield HT.
    - c. Henry Company; Blueskin PE200 HT.
    - d. Owens Corning; WeatherLock Metal High Temperature Underlayment.
- B. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

## 2.4 MISCELLANEOUS MATERIALS

- A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
  - 1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
- B. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- C. Gutters: Formed from same material as roof panels, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- (2400-mm-) long sections, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Furnish gutter supports spaced a maximum of 36 inches (914 mm) o.c., fabricated from same metal as gutters. Provide wire ball strainers of compatible metal at outlets. Finish gutters to match metal roof panels.
- D. Downspouts: Formed from same material as roof panels. Fabricate in 10-foot- (3-m-) long sections, complete with formed elbows and offsets, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Finish downspouts to match gutters.
- E. Soffit Panels: Formed of same material as roof panels, of different color as selected by Architect from Manufacturer's full range. Panels shall be flat seamed with concealed fasteners, and edge trim to match.
- F. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- G. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
  - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
  - 2. Joint Sealant: ASTM C 920; elastomeric silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.

## 2.5 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs for full length of panel.
- C. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
  - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.

## 2.6 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel Panels and Accessories:
  1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions. Colors as selected by Architect from Manufacturer's full range.
  2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
  1. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.
    - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

### 3.3 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches (152 mm) staggered 24 inches (610 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Extend underlayment into gutter trough. Roll laps with roller. Cover underlayment within 14 days.
  - 1. Apply over the entire roof surface.
- B. Slip Sheet: Apply slip sheet over underlayment before installing metal roof panels.

### 3.4 METAL PANEL INSTALLATION

- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
  - 1. Shim or otherwise plumb substrates receiving metal panels.
  - 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
  - 3. Install screw fasteners in predrilled holes.
  - 4. Locate and space fastenings in uniform vertical and horizontal alignment.
  - 5. Install flashing and trim as metal panel work proceeds.
  - 6. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
  - 7. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
  - 1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
- C. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.
- D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- E. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
  - 1. Install clips to supports with self-tapping fasteners.
  - 2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
  - 3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
  - 4. Watertight Installation:

- a. Apply a continuous ribbon of sealant or tape to seal joints of metal panels, using sealant or tape as recommend in writing by manufacturer as needed to make panels watertight.
  - b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
- F. Soffit Panel Installation: Install below steel tube framing and roof deck, with light-gauge metal framing as required to span between supports. Use concealed fasteners and edge trim to match soffit panels.
- G. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.
- H. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.
  2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).
- I. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36 inches (914 mm) o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
- J. Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1524 mm) o.c. in between.
1. Connect downspouts to downspout boots.
- K. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

### 3.5 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

### 3.6 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect metal roof panel installation, including accessories. Report results in writing.

- B. Remove and replace applications of metal roof panels where tests and inspections indicate that they do not comply with specified requirements.
- C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

### **3.7 CLEANING AND PROTECTION**

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

**END OF SECTION 07 61 13**

## SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Prefinished formed roof-drainage sheet metal fabrications.
  - 2. Prefinished formed steep-slope roof sheet metal fabrications.
  - 3. Thru-wall flashings at openings and base of exterior walls.
- B. Related Requirements:
  - 1. Section 06 10 00 "Rough Carpentry" for wood nailers, curbs, and blocking.
  - 2. Section 06 16 00 "Sheathing" for roof sheathing.
  - 3. Section 07 61 13 "Standing-Seam Metal Roofing" for coordination of sheet metal work.

#### 1.3 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

#### 1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
  - 3. Review requirements for insurance and certificates if applicable.
  - 4. Review sheet metal flashing observation and repair procedures after flashing installation.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

- B. Shop Drawings: For sheet metal flashing and trim.
  - 1. Include plans, elevations, sections, and attachment details.
  - 2. Include identification of material, thickness, weight, and finish for each item and location in Project.
  - 3. Include details for forming, including profiles, shapes, seams, and dimensions.
  - 4. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
  - 5. Include details of termination points and assemblies.
  - 6. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
  - 7. Include details of special conditions.
  - 8. Include details of connections to adjoining work.
  - 9. Detail formed flashing and trim at scale of not less than 1:10 (1-1/2 inches per 12 inches).
- C. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.
- D. Samples for Verification: For each type of exposed finish.
  - 1. Sheet Metal Flashing: 300 mm (12 inches) long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
  - 2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 300 mm (12 inches) long and in required profile. Include fasteners and other exposed accessories.
  - 3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.
  - 4. Anodized Aluminum Samples: Samples to show full range to be expected for each color required.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Product Certificates: For each type of coping and roof edge flashing that is SPRI ES-1 tested.
- C. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- D. Sample Warranty: For special warranty.

## 1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

## 1.8 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
  - 1. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
  - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

## 1.10 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  2. Finish Warranty Period: 20 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. SPRI Wind Design Standard: Manufacture and install roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressure:
  1. Design Pressure: As indicated on Drawings.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  1. Temperature Change: 67 deg C (120 deg F), ambient; 100 deg C (180 deg F), material surfaces.

## 2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, Z275 (G90) coating designation or aluminum-zinc alloy-coated steel sheet according to ASTM A 792/A 792M, Class AZM150 (Class AZ50) coating designation, Grade 275 (Grade 40); prepainted by coil-coating process to comply with ASTM A 755/A 755M.
  - 1. Surface: Smooth, flat.
  - 2. Exposed Coil-Coated Finish:
    - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 3. Color: As selected by Architect from manufacturer's full range.
  - 4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.013 mm (0.5 mil).
- C. Thru-Wall Flashings: Stainless steel sheet, bent to form and with sealed joints. Turn up ends at opening jambs.

## 2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
  - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
    - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
    - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
    - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
  - 2. Fasteners for Zinc-Coated (Galvanized) or Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 13 mm (1/2 inch) wide and 3 mm (1/8 inch) thick.
- D. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.
- F. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

## 2.4 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
  2. Obtain field measurements for accurate fit before shop fabrication.
  3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
  4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 6 mm in 6 m (1/4 inch in 20 feet) on slope and location lines indicated on Drawings and within 3-mm (1/8-inch) offset of adjoining faces and of alignment of matching profiles.
- C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."
- D. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
1. Form expansion joints of intermeshing hooked flanges, not less than 25 mm (1 inch) deep, filled with butyl sealant concealed within joints.
  2. Use lapped expansion joints only where indicated on Drawings.
- E. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- G. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
- H. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- I. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- J. Do not use graphite pencils to mark metal surfaces.

## 2.5 ROOF-DRAINAGE SHEET METAL FABRICATIONS

- A. Hanging Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 2400-mm- (96-inch-) long sections. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.
1. Gutter Profile: Style F according to cited sheet metal standard.
  2. Expansion Joints: Butt type with cover plate.
  3. Accessories: Wire-ball downspout strainer.

4. Gutters with Girth 410 to 510 mm (16 to 20 Inches): Fabricate from the following materials:
  - a. Galvanized Steel: 0.71 mm (0.028 inch) thick.
  - b. Aluminum-Zinc Alloy-Coated Steel: 0.71 mm (0.028 inch) thick.
- B. Downspouts: Fabricate rectangular downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.
  1. Fabricated Hanger Style: Fig 1-35A according to SMACNA's "Architectural Sheet Metal Manual."
  2. Fabricate from the following materials:
    - a. Galvanized Steel: 0.56 mm (0.022 inch) thick.
    - b. Aluminum-Zinc Alloy-Coated Steel: 0.56 mm (0.022 inch) thick.

## 2.6 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Valley Flashing: Fabricate from the following materials:
  1. Galvanized Steel: 0.71 mm (0.028 inch) thick.
  2. Aluminum-Zinc Alloy-Coated Steel: 0.71 mm (0.028 inch) thick.
- B. Drip Edges: Fabricate from the following materials:
  1. Galvanized Steel: 0.56 mm (0.022 inch) thick.
  2. Aluminum-Zinc Alloy-Coated Steel: 0.56 mm (0.022 inch) thick.
- C. Eave, Rake Flashing: Fabricate from the following materials:
  1. Galvanized Steel: 0.56 mm (0.022 inch) thick.
  2. Aluminum-Zinc Alloy-Coated Steel: 0.56 mm (0.022 inch) thick.
- D. Roof-Penetration Flashing: Fabricate from the following materials:
  1. Galvanized Steel: 0.71 mm (0.028 inch) thick.
  2. Aluminum-Zinc Alloy-Coated Steel: 0.71 mm (0.028 inch) thick.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
  1. Verify compliance with requirements for installation tolerances of substrates.
  2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
  3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
  2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
  3. Space cleats not more than 300 mm (12 inches) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
  4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
  5. Torch cutting of sheet metal flashing and trim is not permitted.
  6. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 3 m (10 feet) with no joints within 600 mm (24 inches) of corner or intersection.
1. Form expansion joints of intermeshing hooked flanges, not less than 25 mm (1 inch) deep, filled with sealant concealed within joints.
- D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 25 mm (1 inch) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 4 and 21 deg C (40 and 70 deg F), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 4 deg C (40 deg F).
  2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

### 3.3 ROOF-DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.
- B. Hanging Gutters: Join sections with joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.
1. Fasten gutter spacers to front and back of gutter.

2. Anchor gutter with gutter brackets spaced not more than 600 mm (24 inches) apart to roof structure, unless otherwise indicated, and loosely lock to front gutter bead.
  3. Install gutter with expansion joints at locations indicated, but not exceeding, 15.24 m (50 feet) apart. Install expansion-joint caps.
- C. Downspouts: Join sections with 38-mm (1-1/2-inch) telescoping joints.
1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 1500 mm (60 inches) o.c.
  2. Provide elbows at base of downspout to direct water away from building.
  3. Connect downspouts to underground drainage system, or as indicated on drawings.

### 3.4 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.
- C. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

### 3.5 THRU-WALL FLASHINGS

- A. Preform and prepare thru-wall flashings at all openings and at base of all exterior walls. Extend up the wall at least 8" behind sheathing, and past the face of exterior wall finish ¼" constant.

### 3.6 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 6 mm in 6 m (1/4 inch in 20 feet) on slope and location lines indicated on Drawings and within 3-mm (1/8-inch) offset of adjoining faces and of alignment of matching profiles.

### 3.7 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 62 00

## SECTION 07 84 13 - PENETRATION FIRESTOPPING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Penetrations in fire-resistance-rated walls.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
  - 1. Cut sheet for each system used must be on-site and available at any time for the State Fire Marshal review when inspecting the project.
- B. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.
  - 1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

- B. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:
1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
  2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:
    - a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
    - b. Classification markings on penetration firestopping correspond to designations listed by the following:
      - 1) UL in its "Fire Resistance Directory."
      - 2) FM Global in its "Building Materials Approval Guide."
- C. Single Source Requirement: All systems required for the project shall be by a single manufacturer.
- D. Preinstallation Conference: Conduct conference at Project site.

## 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

## 1.7 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.
- C. Notify Owner's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Grace Construction Products.
  2. Hilti, Inc.
  3. 3M Fire Protection Products.
  4. Tremco, Inc.; Tremco Fire Protection Systems Group.

## 2.2 PENETRATION FIRESTOPPING

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
  - 1. Fire-resistance-rated walls include fire partitions.
  - 2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
  - 1. Sealants: 250 g/L.
  - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
  - 3. Sealant Primers for Porous Substrates: 775 g/L.
- D. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
  - 1. Permanent forming/damming/backing materials, including the following:
    - a. Slag-wool-fiber or rock-wool-fiber insulation.
    - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
    - c. Fire-rated form board.
    - d. Fillers for sealants.
  - 2. Temporary forming materials.
  - 3. Substrate primers.
  - 4. Collars.
  - 5. Steel sleeves.

## 2.3 FILL MATERIALS

- A. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- B. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- C. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.
- D. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- E. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- F. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

- G. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- H. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- I. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
  - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

## 2.4 MIXING

- A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:
  - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
  - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

### 3.3 INSTALLATION

- A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
  - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.
- C. Install fill materials for firestopping by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 IDENTIFICATION

- A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
  - 1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
  - 2. Contractor's name, address, and phone number.
  - 3. Designation of applicable testing and inspecting agency.
  - 4. Date of installation.
  - 5. Manufacturer's name.
  - 6. Installer's name.

### 3.5 FIELD QUALITY CONTROL

- A. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.
- B. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

### 3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

**3.7 PENETRATION FIRESTOPPING SCHEDULE**

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.
- B. Where FM Global-approved systems are indicated, they refer to design numbers listed in FM Global's "Building Materials Approval Guide" under "Wall and Floor Penetration Fire Stops."
- C. Firestopping with No Penetrating Items:
  - 1. UL-Classified Systems: C-AJ- 0001-0999.
  - 2. F-Rating: 1 hour.
  - 3. Type of Fill Materials: As required to achieve rating.
- D. Firestopping for Metallic Pipes, Conduit, or Tubing:
  - 1. UL-Classified Systems: C-AJ- 1001-1999.
  - 2. F-Rating: 1 hour.
  - 3. Type of Fill Materials: As required to achieve rating.
- E. Firestopping for Nonmetallic Pipe, Conduit, or Tubing:
  - 1. UL-Classified Systems: C-AJ- 2001-2999.
  - 2. F-Rating: 1 hour.
  - 3. Type of Fill Materials: As required to achieve rating.
- F. Firestopping for Electrical Cables:
  - 1. UL-Classified Systems: C-AJ- 3001-3999.
  - 2. F-Rating: 1 hour.
  - 3. Type of Fill Materials: As required to achieve rating.
- G. Firestopping for Cable Trays with Electric Cables:
  - 1. UL-Classified Systems: C-AJ- 4001-4999.
  - 2. F-Rating: 1 hour.
  - 3. Type of Fill Materials: As required to achieve rating.
- H. Firestopping for Insulated Pipes:
  - 1. UL-Classified Systems: C-AJ- 5001-5999.
  - 2. F-Rating: 1 hour.
  - 3. Type of Fill Materials: As required to achieve rating.
- I. Firestopping for Miscellaneous Electrical Penetrants:
  - 1. UL-Classified Systems: C-AJ- 6001-6999.
  - 2. F-Rating: 1 hour.
  - 3. Type of Fill Materials: As required to achieve rating.
- J. Firestopping for Miscellaneous Mechanical Penetrants:
  - 1. UL-Classified Systems: C-AJ- 7001-7999.
  - 2. F-Rating: 1 hour.
  - 3. Type of Fill Materials: As required to achieve rating.

- K. Firestopping for Groupings of Penetrants:
1. UL-Classified Systems: C-AJ- 8001-8999.
  2. F-Rating: 1 hour.
  3. Type of Fill Materials: As required to achieve rating.

**END OF SECTION 07 84 13**



## SECTION 07 92 00 - JOINT SEALANTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Silicone joint sealants.
  - 2. Latex joint sealants.
  - 3. Acoustical joint sealants.
- B. Related Sections:
  - 1. Section 08 80 00 "Glazing" for glazing sealants.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.
- C. Warranties: Sample of special warranties.

#### 1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.
- B. Preinstallation Conference: Conduct conference at Project site.

#### 1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 5 deg C (40 deg F).
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

## 1.7 WARRANTY

- A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  1. Warranty Period: Two years from date of Substantial Completion.
- B. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
  1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
  2. Disintegration of joint substrates from natural causes exceeding design specifications.
  3. Mechanical damage caused by individuals, tools, or other outside agents.
  4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

## PART 2 - PRODUCTS

### 2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

### 2.2 SILICONE JOINT SEALANTS

- A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant; JS-2: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation; 795.
    - b. GE Advanced Materials - Silicones; SilGlaze II SCS2800.
    - c. Pecora Corporation; 864.
    - d. Sika Corporation, Construction Products Division; SikaSil-C995.
    - e. Tremco Incorporated; Spectrem 2.

- B. Single-Component, Nonsag, Traffic-Grade, Neutral-Curing Silicone Joint Sealant; JS-1: ASTM C 920, Type S, Grade NS, Class 100/50, for Use T.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation; 790.
    - b. Pecora Corporation; 301 NS.
    - c. Tremco Incorporated; Spectrem 800.
- C. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant; JS-4: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation; 786 Mildew Resistant.
    - b. GE Advanced Materials - Silicones; Sanitary SCS1700.
    - c. Tremco Incorporated; Tremsil 200 Sanitary.

### 2.3 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: JS-3.: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF, paintable.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. BASF Building Systems; Sonolac.
    - b. Bostik, Inc.; Chem-Calk 600.
    - c. Pecora Corporation; AC-20+.
    - d. Schnee-Morehead, Inc.; SM 8200.
    - e. Tremco Incorporated; Tremflex 834.

### 2.4 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Joint Sealant – JS-5: 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; JS-5.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Pecora Corporation; AC-20 FTR.
    - b. USG Corporation; SHEETROCK Acoustical Sealant.

### 2.5 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type O (open-cell material), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

## 2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    - a. Concrete.
    - b. Masonry.
    - c. Unglazed surfaces of ceramic tile.
    - d. Exterior insulation and finish systems.
  - 3. Remove laitance and form-release agents from concrete.
  - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    - a. Metal.
    - b. Glass.
    - c. Glazed surfaces of ceramic tile.

- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of sealant backings.
  - 2. Do not stretch, twist, puncture, or tear sealant backings.
  - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses in each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  - 1. Remove excess sealant from surfaces adjacent to joints.
  - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  - 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
  - 4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
  - 5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.
    - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.
- G. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

### 3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

### 3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

### 3.6 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces; JS-1.
  - 1. Joint Locations:
    - a. Isolation and contraction joints in cast-in-place concrete slabs.
    - b. Other joints as indicated.
  - 2. Silicone Joint Sealant: Single component, nonsag, traffic grade, neutral curing.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces; JS-2.
  - 1. Joint Locations:
    - a. Control and expansion joints in unit masonry.
    - b. Joints in exterior insulation and finish systems.
    - c. Joints between metal panels.
    - d. Joints between different materials listed above.
    - e. Perimeter joints between materials listed above and frames of doors and windows.
    - f. Control and expansion joints in ceilings and other overhead surfaces.
    - g. Other joints as indicated.
  - 2. Silicone Joint Sealant: Single component, nonsag, neutral curing, Class 50.
- C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces; JS-1.
  - 1. Joint Locations:
    - a. Isolation joints in cast-in-place concrete slabs.
    - b. Control and expansion joints in tile flooring.
    - c. Other joints as indicated.
  - 2. Silicone Joint Sealant: Single component, nonsag, traffic grade, neutral curing.
- D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces; JS-3.
  - 1. Joint Locations:
    - a. Perimeter joints of exterior openings where indicated.
    - b. Paintable

- c. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
    - d. Other joints as indicated.
  - 2. Joint Sealant: Latex.
- E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces; JS-4.
  - 1. Joint Sealant Location:
    - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    - b. Tile control and expansion joints where indicated.
    - c. Other joints as indicated.
  - 2. Joint Sealant: Mildew resistant, single component, nonsag, neutral curing, Silicone.
- F. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces; JS-5.
  - 1. Joint Location:
    - a. Acoustical joints where indicated.
    - b. Other joints as indicated.
  - 2. Joint Sealant: Latex.

**END OF SECTION 07 92 00**



## SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes hollow-metal work.
- B. Related Requirements:
  - 1. Section 08 71 00 "Door Hardware" for door hardware for hollow-metal doors.

#### 1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

#### 1.4 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.
- B. Shop Drawings: Include the following:
  - 1. Elevations of each door type.
  - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
  - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
  - 4. Locations of reinforcement and preparations for hardware.
  - 5. Details of each different wall opening condition.
  - 6. Details of anchorages, joints, field splices, and connections.
  - 7. Details of accessories.
  - 8. Details of moldings, removable stops, and glazing.
- C. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
  - 1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 102-mm- (4-inch-) high wood blocking. Provide minimum 6-mm (1/4-inch) space between each stacked door to permit air circulation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Amweld International, LLC.
  - 2. Ceco Door; ASSA ABLOY.
  - 3. Republic Doors and Frames.
  - 4. Steelcraft; an Allegion brand.
- B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

### 2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
  - 1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

### 2.3 INTERIOR HOLLOW-METAL DOORS AND FRAMES

- A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Frames: SDI A250.8, Level 2. At locations indicated in the Door and Frame Schedule.
  - 1. Physical Performance: Level B according to SDI A250.4.
  - 2. Frames:
    - a. Materials: Uncoated steel sheet, minimum thickness of 1.3 mm (0.053 inch).
    - b. Construction: Knocked down.
  - 3. Exposed Finish: Prime Factory.

## 2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

- A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2. At locations indicated in the Door and Frame Schedule.
  - 1. Physical Performance: Level B according to SDI A250.4.
  - 2. Doors:
    - a. Type: As indicated in the Door and Frame Schedule.
    - b. Thickness: 44.5 mm. (1-3/4 inches)
    - c. Face: Metallic-coated steel sheet, minimum thickness of 1.0 mm (0.042 inch), with minimum ZF120 (A40) coating.
    - d. Edge Construction: Model 2, Seamless.
    - e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.
  - 3. Frames:
    - a. Materials: Metallic-coated steel sheet, minimum thickness of 1.3 mm (0.053 inch), with minimum ZF120 (A40) coating.
    - b. Construction: Full profile welded.
  - 4. Exposed Finish: Prime Factory.

## 2.5 FRAME ANCHORS

- A. Jamb Anchors:
  - 1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 1.0 mm (0.042 inch) thick.
  - 2. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 1.0 mm (0.042 inch), and as follows:
  - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

## 2.6 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 12G (04Z) coating designation; mill phosphatized.
  - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

- F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- G. Grout: ASTM C 476, except with a maximum slump of 102 mm (4 inches), as measured according to ASTM C 143/C 143M.
- H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- I. Glazing: Comply with requirements in Section 08 80 00 "Glazing."
- J. Bituminous Coating: Cold-applied asphalt mastic, compounded for 0.4-mm (15-mil) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## 2.7 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
  - 1. Steel-Stiffened Door Cores: Provide minimum thickness 0.66 mm (0.026 inch), steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 152 mm (6 inches) apart. Spot weld to face sheets no more than 127 mm (5 inches) o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
  - 2. Fire Door Cores: As required to provide fire-protection ratings indicated.
  - 3. Vertical Edges for Single-Acting Doors: Bevel edges 3.2 mm in 51 mm (1/8 inch in 2 inches).
  - 4. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
  - 1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  - 2. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
  - 3. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
  - 4. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Stud-Wall Type: Locate anchors not more than 457 mm (18 inches) from top and bottom of frame. Space anchors not more than 813 mm (32 inches) o.c. and as follows:
      - 1) Four anchors per jamb from 1524 to 2286 mm (60 to 90 inches) high.
    - b. Compression Type: Not less than two anchors in each frame.
  - 5. Head Anchors: Two anchors per head for frames more than 1067 mm (42 inches) wide and mounted in metal-stud partitions.

6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
  - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
  1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
  2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.
- F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.
  1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
  2. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
  3. Provide loose stops and moldings on inside of hollow-metal work.
  4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

## 2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
  1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

## 2.9 ACCESSORIES

- A. Louvers: Provide louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.5-mm- (0.020-inch-) thick, cold-rolled steel sheet set into 0.8-mm- (0.032-inch-) thick steel frame.
  1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
  2. Lightproof Louver: Stationary louvers constructed with baffles to prevent light from passing from one side to the other.
  3. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.
- B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- C. Grout Guards: Formed from same material as frames, not less than 0.4 mm (0.016 inch) thick.

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

**3.3 INSTALLATION**

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
  - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. At fire-rated openings, install frames according to NFPA 80.
    - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    - c. Install frames with removable stops located on secure side of opening.
    - d. Install door silencers in frames before grouting.
    - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    - g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
  - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
    - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
  - 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.

4. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
  - a. Squareness: Plus or minus 1.6 mm (1/16 inch), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  - b. Alignment: Plus or minus 1.6 mm (1/16 inch), measured at jambs on a horizontal line parallel to plane of wall.
  - c. Twist: Plus or minus 1.6 mm (1/16 inch), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  - d. Plumbness: Plus or minus 1.6 mm (1/16 inch), measured at jambs at floor.
- C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
  1. Non-Fire-Rated Steel Doors:
    - a. Between Door and Frame Jambs and Head: 3.2 mm (1/8 inch) plus or minus 0.8 mm (1/32 inch).
    - b. Between Edges of Pairs of Doors: 3.2 mm (1/8 inch) to 6.3 mm (1/4 inch) plus or minus 0.8 mm (1/32 inch).
    - c. At Bottom of Door: [19.1 mm (3/4 inch)] [15.8 mm (5/8 inch)] plus or minus 0.8 mm (1/32 inch).
    - d. Between Door Face and Stop: 1.6 mm (1/16 inch) to 3.2 mm (1/8 inch) plus or minus 0.8 mm (1/32 inch).
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
  3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- D. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.
  1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 230 mm (9 inches) o.c. and not more than 51 mm (2 inches) o.c. from each corner.

### 3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow-metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- E. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 08 11 13



## SECTION 08 14 16 - FLUSH WOOD DOORS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Solid-core doors with wood-veneer faces.
  - 2. Fire-rated mineral-core wood doors with wood-veneer faces.
  - 3. Factory finishing flush wood doors.
  - 4. Factory fitting flush wood doors to frames and factory machining for hardware.
- B. Related Requirements:
  - 1. Section 08 80 00 "Glazing" for glass view panels in flush wood doors.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
  - 1. Dimensions and locations of blocking.
  - 2. Dimensions and locations of mortises and holes for hardware.
  - 3. Dimensions and locations of cutouts.
  - 4. Undercuts.
  - 5. Doors to be factory finished and finish requirements.
- C. Samples for Initial Selection: For factory-finished doors.
- D. Samples for Verification:
  - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.
  - 2. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

**1.6 FIELD CONDITIONS**

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

**1.7 WARRANTY**

- A. A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Warping (bow, cup, or twist) more than 6.4 mm (1/4 inch) in a 1067-by-2134-mm (42-by-84-inch) section.
    - b. Telegraphing of core construction in face veneers exceeding 0.25 mm in a 76.2-mm (0.01 inch in a 3-inch) span.
  - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
  - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

**PART 2 - PRODUCTS****2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Algoma Hardwoods, Inc.
  - 2. Eggers Industries.
  - 3. Graham Wood Doors; an Assa Abloy Group company.
  - 4. Ipik Door Company.
  - 5. Marshfield Door Systems, Inc.
  - 6. Oshkosh Door Company.
- B. Source Limitations: Obtain flush wood doors from single manufacturer.

**2.2 FLUSH WOOD DOORS, GENERAL**

- A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."

1. Provide AWI Quality Certification Labels indicating that doors comply with requirements of grades specified.
  2. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.
- B. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that do not contain urea formaldehyde.
- C. Structural-Composite-Lumber-Core Doors:
1. Structural Composite Lumber: WDMA I.S.10.
    - a. Screw Withdrawal, Face: 3100 N (700 lbf).
    - b. Screw Withdrawal, Edge: 1780 N (400 lbf).

### 2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Solid-Core Doors:
1. Grade: Custom, with Grade A faces.
  2. Species: Clear Birch.
  3. Cut: Plain sliced (flat sliced).
  4. Match between Veneer Leaves: Pleasing match.
  5. Assembly of Veneer Leaves on Door Faces: Balance match.
  6. Exposed Vertical Edges: Same species as faces or a compatible species - edge Type A.
  7. Core: Structural composite lumber.
  8. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.
  9. Adhesives: Type I per WDMA T.M.-6.

### 2.4 LIGHT FRAMES AND LOUVERS

- A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.
1. Wood Species: Same species as door faces.
  2. Profile: Flush rectangular beads.

### 2.5 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
1. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
  2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

- C. Openings: Factory cut and trim openings through doors.
  - 1. Light Openings: Trim openings with moldings of material and profile indicated.
  - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 08 80 00 "Glazing."

## 2.6 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
  - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Use only paints and coatings that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- D. Transparent Finish:
  - 1. Grade: Custom.
  - 2. Finish: AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" System 11, catalyzed polyurethane.
  - 3. Staining: Match Architect's sample.
  - 4. Effect: Filled finish.
  - 5. Sheen: Satin.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
  - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Hardware: For installation, see Section 08 71 00 "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

### 3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.
- C. Upon fitting doors into frames, refinish all field sanded and planed surfaces and edges to match factory finish.
- D. Seal tops and bottoms of doors with polyurethane varnish, compatible with doors and factory finish.

**END OF SECTION 08 14 16**



## SECTION 08 31 13 - ACCESS DOORS AND FRAMES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Access doors and frames for walls and ceilings.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details materials, individual components and profiles, and finishes.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, details, and attachments to other work.
  - 2. Detail fabrication and installation of access doors and frames for each type of substrate.
- C. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

### PART 2 - PRODUCTS

#### 2.1 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

- A. Manufacturers: Subject to compliance with requirements, provide products from one of the following manufacturers offering products that may be incorporated into the Work:
  - 1. Access Panel Solutions.
  - 2. Acudor Products, Inc.
  - 3. Alfab, Inc.
  - 4. Babcock-Davis.
  - 5. Cendrex Inc.
  - 6. J. L. Industries, Inc.; Div. of Activar Construction Products Group.
  - 7. Larsen's Manufacturing Company.
  - 8. Maxam Metal Products Limited.
  - 9. Metropolitan Door Industries Corp.
  - 10. Milcor Inc.
  - 11. Nystrom, Inc.

- B. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.
- C. Flush Access Doors with Concealed Flanges:
  - 1. Assembly Description: Fabricate door to fit flush to frame. Provide frame with gypsum board beads for concealed flange installation.
  - 2. Locations: Wall and ceiling.
  - 3. Uncoated Steel Sheet for Door: Nominal 1.52 mm (0.060 inch), 16 gage.
    - a. Finish: Factory prime.
  - 4. Frame Material: Same material and thickness as door.
  - 5. Hinges: Manufacturer's standard.
  - 6. Hardware: Latch.
- D. Exterior Flush Access Doors and Access Doors in Tile Walls:
  - 1. Assembly Description: Fabricate door to be weatherproof and fit flush to frame. Provide manufacturer's standard 50-mm- (2-inch-) thick fiberglass insulation and extruded door gaskets. Provide manufacturer's standard-width frame for surface mounting, proportional to door size.
  - 2. Locations: Wall.
  - 3. Stainless-Steel Sheet for Door: Nominal 1.59 mm (0.062 inch), 16 gage.
    - a. Finish: No. 4.
  - 4. Frame Material: Same material, thickness, and finish as door.
  - 5. Hinges: Manufacturer's standard.
  - 6. Hardware: Lock.
- E. Hardware:
  - 1. Latch: Cam latch operated by screwdriver (interior).
  - 2. Lock: Cylinder (exterior).

## 2.2 MATERIALS

- A. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- B. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 316. Remove tool and die marks and stretch lines or blend into finish.
- C. Frame Anchors: Same type as door face.
- D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

## 2.3 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.
  - 1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
  - 2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded metal lath and exposed casing bead welded to perimeter of frames.
  - 3. Provide mounting holes in frames for attachment of units to metal or wood framing.
- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
  - 1. For cylinder locks, furnish two keys per lock and key all locks alike.
  - 2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

## 2.4 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Steel and Metallic-Coated-Steel Finishes:
  - 1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
- E. Stainless-Steel Finishes:
  - 1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
  - 2. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
    - a. Run grain of directional finishes with long dimension of each piece.
    - b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
    - c. Directional Satin Finish: No. 4.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### **3.2 INSTALLATION**

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

### **3.3 ADJUSTING**

- A. Adjust doors and hardware, after installation, for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

**END OF SECTION 08 31 13**

## SECTION 08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Storefront framing for punched openings.
  - 2. Exterior manual-swing entrance doors and door-frame units.
  - 3. Hurricane shutters.

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
  - 1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
  - 2. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
    - a. Joinery, including concealed welds.
    - b. Anchorage.
    - c. Expansion provisions.
    - d. Glazing.
    - e. Flashing and drainage.
  - 3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- E. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch (300-mm) lengths of full-size components and showing details of the following:

1. Joinery, including concealed welds.
2. Anchorage.
3. Expansion provisions.
4. Glazing.
5. Flashing and drainage.

- F. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.
- G. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.
1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.
- C. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Sample Warranties: For special warranties.

### 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

### 1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:

- a. Structural failures including, but not limited to, excessive deflection.
  - b. Noise or vibration created by wind and thermal and structural movements.
  - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - d. Water penetration through fixed glazing and framing areas.
  - e. Failure of operating components.
2. Warranty Period: 10 years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
1. Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  2. Warranty Period: 20 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design aluminum-framed entrances and storefronts, including blocking.
- B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
  2. Failure also includes the following:
    - a. Thermal stresses transferring to building structure.
    - b. Glass breakage.
    - c. Noise or vibration created by wind and thermal and structural movements.
    - d. Loosening or weakening of fasteners, attachments, and other components.
    - e. Failure of operating units.
- C. Structural Loads:
1. Wind Loads: As indicated on Drawings.
- D. Deflection of Framing Members: At design wind pressure, as follows:
1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding 1/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19.1 mm), whichever is less.
  2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch (3.2 mm), whichever is smaller.
- E. Structural: Test according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
  2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
  3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
1. Fixed Framing and Glass Area:
    - a. Maximum air leakage of 0.06 cfm/sq. ft. (0.30 L/s per sq. m) at a static-air-pressure differential of 6.24 lbf/sq. ft. (300 Pa).
  2. Entrance Doors:
    - a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. (5.08 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).
    - b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. (2.54 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).
- G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft. (720 Pa).
- H. Water Penetration under Dynamic Pressure: Test according to AAMA 501.1 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft. (720 Pa).
  2. Maximum Water Leakage: According to AAMA 501.1. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.
- I. Energy Performance: Certify and label energy performance according to NFRC as follows:
1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.69 Btu/sq. ft. x h x deg F (3.92 W/sq. m x K) as determined according to NFRC 100.
- J. Windborne-Debris Impact Resistance: Pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996 for Wind Zone 3.
1. Large-Missile Test: For glazed openings located within 30 feet (9.1 m) of grade.
- K. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
  2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
    - a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F (82 deg C).
    - b. Low Exterior Ambient-Air Temperature: 0 deg F (minus 18 deg C).
    - c. Interior Ambient-Air Temperature: 75 deg F (24 deg C).

## 2.2 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Kawneer North America; IR 501 or comparable product by one of the following:
  - 1. Oldcastle.
  - 2. United States Aluminum.
- B. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

## 2.3 FRAMING

- A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
  - 1. Construction: Thermally broken.
  - 2. Glazing System: Retained mechanically with gaskets on four sides.
  - 3. Glazing Plane: Center.
  - 4. Finish: High-performance organic finish.
  - 5. Fabrication Method: Field-fabricated stick system.
- B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Materials:
  - 1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
    - a. Sheet and Plate: ASTM B 209 (ASTM B 209M).
    - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
    - c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
    - d. Structural Profiles: ASTM B 308/B 308M.
  - 2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.
    - a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
    - b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
    - c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

## 2.4 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
  - 1. Door Construction: 1-3/4-inch (44.5-mm) overall thickness, with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
  - 2. Door Design: Medium stile; 3-1/2-inch (88.9-mm) nominal width.
  - 3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.

- a. Provide nonremovable glazing stops on outside of door.

## 2.5 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 08 71 00 "Door Hardware."
- B. General: Provide entrance door hardware and entrance door hardware sets indicated in "Entrance Door Hardware Sets" Article for each entrance door to comply with requirements in this Section.
  1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
  2. Opening-Force Requirements:
    - a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lbf (133 N) to set the door in motion and not more than 15 lbf (67 N) to open the door to its minimum required width.
    - b. Accessible Interior Doors: Not more than 5 lbf (22.2 N) to fully open door.
- C. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:
  1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in "Entrance Door Hardware Sets" Article.
  2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.
- D. Butt Hinges: BHMA A156.1, Grade 1, radius corner.
  1. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while entrance door is closed.
  2. Exterior Hinges: Stainless steel, with stainless-steel pin.
  3. Quantities:
    - a. For doors up to 87 inches (2210 mm) high, provide three hinges per leaf.
- E. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- F. Cylinders: As specified in Section 08 71 00 "Door Hardware."
- G. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
- H. Closers: As specified in Section 08 71 00 "Door Hardware."
- I. Weather Stripping: Manufacturer's standard replaceable components.
  1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
- J. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- K. Silencers: BHMA A156.16, Grade 1.
- L. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch (12.7 mm).

## 2.6 GLAZING

- A. Glazing: Comply with Section 08 80 00 "Glazing."
- B. Glazing Sealants: Comply with Section 08 80 00 "Glazing."
- C. Weatherseal Sealants: ASTM C 920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O; chemically curing silicone formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and structural-sealant-glazed storefront manufacturers for this use.
  - 1. Color: Match structural sealant.

## 2.7 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
  - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
  - 2. Reinforce members as required to receive fastener threads.
  - 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system, fabricated from 300 series stainless steel.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch (25.4 mm) that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
  - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

## 2.8 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fitted joints with ends coped or mitered.
  - 3. Physical and thermal isolation of glazing from framing members.
  - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - 5. Provisions for field replacement of glazing from exterior.
  - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

- E. Storefront Framing: Fabricate components for assembly using screw-spline system.
- F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
  - 1. At exterior doors, provide compression weather stripping at fixed stops.
- G. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
  - 1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
  - 2. At exterior doors, provide weather sweeps applied to door bottoms.
- H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

## 2.9 ALUMINUM FINISHES

- A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare surfaces that are in contact with structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

### 3.3 INSTALLATION

- A. General:
  - 1. Comply with manufacturer's written instructions.
  - 2. Do not install damaged components.
  - 3. Fit joints to produce hairline joints free of burrs and distortion.
  - 4. Rigidly secure nonmovement joints.
  - 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
  - 6. Seal perimeter and other joints watertight unless otherwise indicated.

- B. Metal Protection:
  - 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
  - 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Set continuous sill members and flashing in full sealant bed as specified in Section 07 92 00 "Joint Sealants" to produce weathertight installation.
- D. Install components plumb and true in alignment with established lines and grades.
- E. Install glazing as specified in Section 08 80 00 "Glazing."
- F. Install weatherseal sealant according to Section 07 92 00 "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.
- G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
  - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
  - 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

### 3.4 ERECTION TOLERANCES

- A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:
  - 1. Plumb: 1/8 inch in 10 feet (3.2 mm in 3 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
  - 2. Level: 1/8 inch in 20 feet (3.2 mm in 6 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
  - 3. Alignment:
    - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch (12.7 mm) wide, limit offset from true alignment to 1/16 inch (1.6 mm).
    - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch (12.7 to 25.4 mm) wide, limit offset from true alignment to 1/8 inch (3.2 mm).
    - c. Where surfaces are separated by reveal or protruding element of 1 inch (25.4 mm) wide or more, limit offset from true alignment to 1/4 inch (6 mm).
  - 4. Location: Limit variation from plane to 1/8 inch in 12 feet (3.2 mm in 3.6 m); 1/2 inch (12.7 mm) over total length.

### 3.5 MAINTENANCE SERVICE

- A. Entrance Door Hardware:
  - 1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.
  - 2. Initial Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of entrance door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper

entrance door hardware operation at rated speed and capacity. Use parts and supplies that are the same as those used in the manufacture and installation of original equipment.

**END OF SECTION 08 41 13**

## SECTION 08 56 19 - PASS WINDOWS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes aluminum and glass pass windows for interior locations.
- B. Related Requirements:
  - 1. Section 06 40 23 "Interior Architectural Woodwork" for countertops.
  - 2. Section 08 80 00 "Glazing" for glass.
  - 3. Section 09 29 00 "Gypsum Board" for jamb and head conditions.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
- C. Samples: For aluminum windows and components required, showing full range of color variations for finishes, and prepared on Samples of size indicated below:
  - 1. Exposed Finishes: 2 by 4 inches (50 by 100 mm).
  - 2. Exposed Hardware: Full-size units.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Sample Warranties: For manufacturer's warranties.

#### 1.5 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Stylmark, Inc. (1-800-329-2495).
  - 2. Hafele Sales (1-800-423-3531).
  - 3. Stanley Hardware (1-800-337-4393).

### 2.2 ALUMINUM WINDOWS

- A. Window Type: Interior pass window, as indicated on Drawings.
  - 1. Horizontal sliding.
- B. Basis of Design: Stylmark Sliding Assembly #610005.
- C. Construction: Provide units with top track, side jambs, and bottom track recessed in counter.
- D. Finish: Class I, clear anodic finish; complying with AAMA 611.
- E. Trim: Provide indicated trim, matching material and finish of frame members.
- F. Lock: Manufacturer's standard removable, adjustable, slip-on key lock.
- G. Provide anodized aluminum handle on glass for sliding windows.
- H. Provide heavy-duty stainless-steel, ball-bearing sash rollers with nylon tires for sliding windows.
- I. Equip units with weatherstripping to minimize sound of sliding sashes.
- J. Glaze units with clear safety glass, complying with Section 08 80 00 "Glazing."

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Set units level, plumb, and true to line, without warp or rack of frames and panels. Provide proper support and anchor securely in place with concealed fasteners.

- B. Set tracks on all sides in bed of sealant, to provide sturdy construction and quiet operation.
- C. Adjust operating panels, frames, and hardware to provide a tight fit at contact points and weather stripping for smooth and quiet operation. Lubricate hardware and moving parts.
- D. Clean glass and aluminum surfaces immediately after installing windows. Remove nonpermanent labels from glass surfaces.

**END OF SECTION 08 56 19**



## SECTION 08 71 00 - DOOR HARDWARE

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes:
  - 1. Mechanical door hardware for the following:
    - a. Swinging doors.
  - 2. Cylinders and closers for door hardware specified in other Sections.

#### 1.3 DOOR HARDWARE ALLOWANCE

- A. Furnish door hardware as part of Door Hardware Allowance.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Details of electrified door hardware, indicating the following:
  - 1. Wiring Diagrams: For power, signal, and control wiring and including the following:
    - a. Details of interface of electrified door hardware and building safety and security systems.
    - b. Schematic diagram of systems that interface with electrified door hardware.
    - c. Point-to-point wiring.
    - d. Risers.
    - e. Elevations doors controlled by electrified door hardware.
- C. Other Action Submittals:
  - 1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
    - a. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.

- b. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
  - c. Content: Include the following information:
    - 1) Identification number, location, hand, fire rating, size, and material of each door and frame.
    - 2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
    - 3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
    - 4) Description of electrified door hardware sequences of operation and interfaces with other building control systems.
    - 5) Fastenings and other pertinent information.
    - 6) Explanation of abbreviations, symbols, and codes contained in schedule.
    - 7) Mounting locations for door hardware.
    - 8) List of related door devices specified in other Sections for each door and frame.
2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and Architectural Hardware Consultant.
- B. Product Certificates: For electrified door hardware, from the manufacturer.
  - 1. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
- C. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.
- D. Warranty: Special warranty specified in this Section.

## 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.

## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
  - 1. Warehousing Facilities: In Project's vicinity.
  - 2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
  - 3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

- B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as follows:
1. For door hardware, an Architectural Hardware Consultant (AHC).
- C. Source Limitations: Obtain each type of door hardware from a single manufacturer.
- D. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.
- E. Means of Egress Doors: Latches do not require more than 67 N (15 lbf) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- F. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.
1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 22.2 N (5 lbf).
  2. Comply with the following maximum opening-force requirements:
    - a. Interior, Non-Fire-Rated Hinged Doors: 22.2 N (5 lbf) applied perpendicular to door.
    - b. Sliding or Folding Doors: 22.2 N (5 lbf) applied parallel to door at latch.
  3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 13 mm (1/2 inch) high.
  4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 75 mm (3 inches) from the latch, measured to the leading edge of the door.
- G. Keying Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." In addition to Owner Contractor, and Architect, conference participants shall also include Installer's Architectural Hardware Consultant and Owner's security consultant. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
  2. Preliminary key system schematic diagram.
  3. Requirements for key control system.
  4. Requirements for access control.
  5. Address for delivery of keys.
- H. Preinstallation Conference: Conduct conference at Project site.
1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  2. Inspect and discuss preparatory work performed by other trades.
  3. Inspect and discuss electrical roughing-in for electrified door hardware.
  4. Review sequence of operation for each type of electrified door hardware.
  5. Review required testing, inspecting, and certifying procedures.

**1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys and permanent cores to Owner by registered mail or overnight package service, with a receipt to Architect.

**1.9 COORDINATION**

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

**1.10 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including excessive deflection, cracking, or breakage.
    - b. Faulty operation of doors and door hardware.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
  - 2. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.
    - a. Exit Devices: Two years from date of Substantial Completion.
    - b. Manual Closers: 10 years from date of Substantial Completion.

**1.11 MAINTENANCE SERVICE**

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Provide parts and supplies that are the same as those used in the manufacture and installation of original products.

## PART 2 - PRODUCTS

### 2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door to comply with requirements in this Section.
  - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:
  - 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.

### 2.2 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Hager Companies.
    - b. IVES Hardware; an Ingersoll-Rand company.
    - c. McKinney Products Company; an ASSA ABLOY Group company.
    - d. Stanley Commercial Hardware; Div. of The Stanley Works.

### 2.3 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
  - 1. Bored Locks: Minimum 13-mm (1/2-inch) latchbolt throw.
  - 2. Deadbolts: Minimum 25-mm (1-inch) bolt throw.
- C. Lock Backset: 70 mm (2-3/4 inches), unless otherwise indicated.
- D. Lock Trim:
  - 1. Levers: Cast.
    - a. Corbin Russwin; Princeton, PZD, or equal by Yale, Schlage, or Sargent .
  - 2. Escutcheons (Roses): Wrought.
  - 3. Operating Device: Lever with escutcheons (roses).
- E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

F. Bored Locks: BHMA A156.2; Grade 1; Series 4000.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Corbin Russwin Architectural Hardware; n ASSA ABLOY Group Company.
  - b. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
  - c. Schlage Commercial Lock Division; an Ingersoll-Rand company.
  - d. Yale Commercial Locks and Hardware.

## 2.4 SURFACE BOLTS

A. Surface Bolts: BHMA A156.16.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Hager Companies.
  - b. IVES Hardware; an Ingersoll-Rand company.
  - c. Trimco.

## 2.5 EXIT DEVICES AND AUXILIARY ITEMS

A. Exit Devices and Auxiliary Items: BHMA A156.3.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
  - b. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
  - c. Von Duprin; an Ingersoll-Rand company.

## 2.6 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

1. Manufacturer: Same manufacturer as for locking devices.

B. High-Security Lock Cylinders: BHMA A156.30; Grade 1; Type ; permanent cores that are removable; face finished to match lockset.

C. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

## 2.7 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.

1. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders.
- B. Keys: Nickel silver.
1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
    - a. Notation: "DO NOT DUPLICATE."
  2. Quantity: In addition to one extra key blank for each lock, provide the following:
    - a. Cylinder Change Keys: Three.
    - b. Master Keys: Five.
    - c. Grand Master Keys: Five.
- C. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal key cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.
1. Acceptable Manufacturers:
    - a. Lund Equipment (LU).
    - b. MMF Industries (MM).
    - c. Telkee (TK).

## 2.8 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; stainless steel, unless otherwise indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Hager Companies.
    - b. IVES Hardware; an Ingersoll-Rand company.
    - c. Rockwood Manufacturing Company.
    - d. Trimco.

## 2.9 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
    - b. LCN Closers; an Ingersoll-Rand company.
    - c. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
    - d. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

**2.10 MECHANICAL STOPS AND HOLDERS**

- A. Floor-Mounted Stops: BHMA A156.16; polished cast brass, bronze, or aluminum base metal.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Hager Companies.
    - b. IVES Hardware; an Ingersoll-Rand company.
    - c. Trimco.

**2.11 DOOR GASKETING**

- A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.000774 cu. m/s per m (0.50 cfm per foot) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. National Guard Products.
    - b. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
    - c. Reese Enterprises, Inc.
    - d. Zero International.

**2.12 THRESHOLDS**

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. National Guard Products.
    - b. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
    - c. Reese Enterprises, Inc.
    - d. Zero International.

**2.13 METAL PROTECTIVE TRIM UNITS**

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 1.3-mm- (0.050-inch-) thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Hager Companies.
    - b. IVES Hardware; an Ingersoll-Rand company.
    - c. Rockwood Manufacturing Company.
    - d. Trimco.

**2.14 AUXILIARY DOOR HARDWARE**

- A. Auxiliary Hardware: BHMA A156.16.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Hager Companies.
- b. Rockwood Manufacturing Company.
- c. Trimco.

## 2.15 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.
  1. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.
- C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
  1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
  2. Fire-Rated Applications:
    - a. Wood or Machine Screws: For the following:
      - 1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
      - 2) Strike plates to frames.
      - 3) Closers to doors and frames.
    - b. Steel Through Bolts: For the following unless door blocking is provided:
      - 1) Closers to doors and frames.
  3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
  4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."

## 2.16 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

- A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
- B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."

**3.3 INSTALLATION**

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
  - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
  - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing. Do not install surface-mounted items until finishes have been completed on substrates involved.
  - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
  - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 750 mm (30 inches) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Lock Cylinders: Install construction cores to secure building and areas during construction period.
  - 1. Replace construction cores with permanent cores as directed by Owner.
- E. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 07 92 00 "Joint Sealants."

- F. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- G. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- H. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

### 3.4 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
  - 1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

### 3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
  - 1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
  - 2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

### 3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

### 3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Section 01 79 00 "Demonstration and Training."

**END OF SECTION 08 71 00**



## SECTION 08 80 00 - GLAZING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes:
  - 1. Clear glass for windows, doors, and storefront framing.
  - 2. Translucent glass for storefront framing and windows.
  - 3. Glazing sealants and accessories.

#### 1.3 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.

#### 1.4 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of [glass product other than clear monolithic vision glass] [the following products]; 300 mm (12 inches) square.
  - 1. Tinted glass.
  - 2. Coated glass.
  - 3. Laminated glass.
  - 4. Insulating glass.
- C. Glazing Accessory Samples: For sealants and colored spacers, in 300-mm (12-inch) lengths.

- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For glass.
- C. Preconstruction adhesion and compatibility test report.
- D. Sample Warranties: For special warranties.

## 1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved by coated-glass manufacturer.
- B. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
  - 1. Install glazing in mockups specified in Section 08 41 13 "Aluminum-Framed Entrances and Storefronts" to match glazing systems required for Project, including glazing methods.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
  - 1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
  - 2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
  - 3. Test no fewer than four Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
  - 4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
  - 5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

## 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

## 1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 4.4 deg C (40 deg F).

## 1.11 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
1. Warranty Period: 10 years from date of Substantial Completion.
- C. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
1. Warranty Period: 10 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Oldcastle BuildingEnvelope™.
  2. PPG Industries, Inc.
  3. Viracon, Inc.
- B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
1. Obtain tinted glass from single source from single manufacturer.
  2. Obtain reflective-coated glass from single source from single manufacturer.
- C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

## 2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design glazing.
- C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.
  - 1. Design Wind Pressures: As indicated on Drawings.
- D. Windborne-Debris-Impact Resistance: Exterior glazing shall comply with basic-protection testing requirements in ASTM E 1996 for local wind zone when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on Project and shall be installed in same manner as glazing indicated for use on Project.
  - 1. Large-Missile Test: For glazing located within 9.1 m (30 feet) of grade.
  - 2. Small-Missile Test: For glazing located more than 9.1 m (30 feet) above grade.
- E. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- F. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
  - 1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
  - 2. For laminated-glass lites, properties are based on products of construction indicated.
  - 3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
  - 4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as W/sq. m x K (Btu/sq. ft. x h x deg F).
  - 5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
  - 6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

## 2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  - 1. GANA Publications: ["Laminated Glazing Reference Manual" and "Glazing Manual."
  - 2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR A7, "Sloped Glazing Guidelines."
  - 3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
  - 4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
  - 1. Minimum Glass Thickness for Exterior Lites: 6 mm.
  - 2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

## 2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.
- B. Tinted Annealed Float Glass: ASTM C 1036, Type I, Class 2 (tinted), Quality-Q3.
- C. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
  - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- D. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
  - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

## 2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
  - 1. Construction: Laminate glass with polyvinyl butyral interlayer, ionomeric polymer interlayer, or cast-in-place and cured-transparent-resin interlayer to comply with interlayer manufacturer's written instructions.
  - 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
  - 3. Interlayer Color: Clear unless otherwise indicated.
- B. Windborne-Debris-Impact-Resistant Laminated Glass: Comply with requirements specified above for laminated glass except laminate glass with one of the following to comply with interlayer manufacturer's written instructions:
  - 1. Polyvinyl butyral interlayer.
  - 2. Polyvinyl butyral interlayers reinforced with polyethylene terephthalate film.
  - 3. Ionomeric polymer interlayer.
  - 4. Cast-in-place and cured-transparent-resin interlayer.
  - 5. Cast-in-place and cured-transparent-resin interlayer reinforced with polyethylene terephthalate film.

## 2.6 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
  2. Spacer: Manufacturer's standard spacer material and construction.
  3. Desiccant: Molecular sieve or silica gel, or a blend of both.

## 2.7 GLAZING SEALANTS

- A. General:
1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
  3. Field-applied sealants shall have a VOC content of not more than 250 g/L.
  4. Sealants shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services) "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
  5. Colors of Exposed Glazing Sealants: [As indicated by manufacturer's designations] [Match Architect's samples] [As selected by Architect from manufacturer's full range].
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

## 2.8 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
1. AAMA 804.3 tape, where indicated.
  2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
  2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

## 2.9 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

## 2.10 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
  - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
    - a. Temperature Change: 67 deg C (120 deg F), ambient; 100 deg C (180 deg F), material surfaces.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  - 2. Presence and functioning of weep systems.
  - 3. Minimum required face and edge clearances.
  - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

### 3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 1270 mm (50 inches).
  - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
  - 2. Provide 3-mm (1/8-inch) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

### 3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.

- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

### 3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

### 3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

### 3.7 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
  - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

### 3.8 MONOLITHIC GLASS SCHEDULE

- A. Glass Type GL-1: Clear fully tempered float glass.
  - 1. Minimum Thickness: 6 mm.
  - 2. Safety glazing required.

### 3.9 LAMINATED GLASS SCHEDULE

- A. Glass Type GL-2: Clear laminated glass with two plies of fully tempered float glass.
  - 1. Safety glazing required.

### 3.10 INSULATING-LAMINATED-GLASS SCHEDULE

- A. Glass Type GL-3: Clear insulating laminated glass.
  - 1. Overall Unit Thickness: 30 mm (1-3/16 inch).
  - 2. Minimum Thickness of Outdoor Lite: 6 mm.
  - 3. Outdoor Lite: Heat-strengthened float glass.
  - 4. Interspace Content: Air.
  - 5. Indoor Lite: Clear laminated glass with two plies of fully tempered float glass.
  - 6. Safety glazing required.
- B. Glass Type GL-4: Translucent, insulating laminated glass.
  - 1. Overall Unit Thickness: 30 mm (1-3/16 inch).
  - 2. Minimum Thickness of Outdoor Lite: 6 mm.
  - 3. Outdoor Lite: Translucent heat-strengthened float glass.
  - 4. Tint Color: As selected by Architect from manufacturer's full range.
  - 5. Interspace Content: Air.
  - 6. Indoor Lite: Translucent laminated glass with two plies of fully tempered float glass.
  - 7. Safety glazing required.

**END OF SECTION 08 80 00**

## SECTION 08 91 19 - FIXED LOUVERS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Fixed, extruded-aluminum louvers.

#### 1.3 DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.
- B. Horizontal Louver: Louver with horizontal blades (i.e., the axes of the blades are horizontal).
- C. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.
- D. Wind-Driven-Rain-Resistant Louver: Louver that provides specified wind-driven rain performance, as determined by testing according to AMCA 500-L.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.
- B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
  - 1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
- C. Samples: For each type of metal finish required.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

- B. Windborne-debris-impact-resistance test reports.

## 1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

## 1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.
  - 1. Wind Loads: Determine loads based on pressures as indicated on Drawings.
- B. Windborne-Debris-Impact Resistance: Louvers located within 9.1 m (30 feet) of grade shall pass basic-protection, large-missile testing requirements in ASTM E 1996 for Wind Zone 3 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than louvers indicated for use on Project.
- C. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
  - 1. Temperature Change (Range): 67 deg C (120 deg F), ambient; 100 deg C (180 deg F), material surfaces.
- E. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

### 2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

- A. Horizontal, Wind-Driven-Rain-Resistant Louver:
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Air Balance Inc.; a Mestek company.
  - b. Air Flow Company, Inc.
  - c. Airolite Company, LLC (The).
  - d. All-Lite Architectural Products.
  - e. American Warming and Ventilating; a Mestek company.
  - f. Architectural Louvers; Harray, LLC.
  - g. Arrow United Industries; a division of Mestek, Inc.
  - h. Construction Specialties, Inc.
  - i. Greenheck Fan Corporation.
  - j. Industrial Louvers, Inc.
  - k. NCA Manufacturing, Inc.
  - l. Nystrom, Inc.
  - m. Pottorff.
  - n. Reliable Products, Inc.
  - o. Ruskin Company; Tomkins PLC.
  - p. United Enertech.
2. Louver Depth: 125 mm (5 inches).
  3. Frame and Blade Nominal Thickness: Not less than 1.52 mm (0.060 inch) for blades and 2.03 mm (0.080 inch) for frames.
  4. Louver Performance Ratings:
    - a. Free Area: Not less than 0.46 sq. m (5.0 sq. ft.) for 1220-mm- (48-inch-) wide by 1220-mm - (48-inch-) high louver.
    - b. Air Performance: Not more than 25-Pa (0.10-inch wg) static pressure drop at 3.0-m/s (600-fpm) free-area velocity.
    - c. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 200 mm (8 inches) per hour and a wind speed of 22.4 m/s (50 mph) at a core-area intake velocity of 1.5 m/s (300 fpm).
  5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

## 2.4 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.
  1. Screen Location for Fixed Louvers: Interior face.
  2. Screening Type: Insect screening.
- B. Secure screen frames to louver frames with stainless-steel machine screws, spaced a maximum of 150 mm (6 inches) from each corner and at 300 mm (12 inches) o.c.
- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
  1. Metal: Same type and form of metal as indicated for louver to which screens are attached.
  2. Finish: Mill finish unless otherwise indicated.
  3. Type: Rewirable frames with a driven spline or insert.
- D. Louver Screening for Aluminum Louvers:
  1. Insect Screening: Aluminum, 1.4-by-1.6-mm (18-by-16) mesh, 0.30-mm (0.012-inch) wire.

## 2.5 MATERIALS

- A. Aluminum Extrusions: ASTM B 221M (ASTM B 221), Alloy 6063-T5, T-52, or T6.
- B. Fasteners: Use types and sizes to suit unit installation conditions.
  - 1. Use tamper-resistant screws for exposed fasteners unless otherwise indicated.
  - 2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
  - 3. For color-finished louvers, use fasteners with heads that match color of louvers.
- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

## 2.6 FABRICATION

- A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.
- C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
  - 1. Frame Type: Channel unless otherwise indicated.
- D. Include supports, anchorages, and accessories required for complete assembly.
- E. Provide subsills made of same material as louvers for recessed louvers.
- F. Join frame members to each other and to fixed louver blades with fillet welds concealed from view unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

## 2.7 ALUMINUM FINISHES

- A. Finish louvers after assembly.
- B. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

### 3.3 INSTALLATION

- A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Protect unpainted galvanized and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.
- F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 07 92 00 "Joint Sealants" for sealants applied during louver installation.

### 3.4 ADJUSTING AND CLEANING

- A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
  - 1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

**END OF SECTION 08 91 19**



## SECTION 09 29 00 - GYPSUM BOARD

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Interior gypsum board.
  - 2. Sound batt insulation.
- B. Related Sections:
  - 1. Section 06 10 53 "Rough Carpentry" for wood studs and framing.
  - 2. Section 09 91 23 "Interior Painting."

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

#### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

#### 1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

**PART 2 - PRODUCTS****2.1 PERFORMANCE REQUIREMENTS**

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

**2.2 GYPSUM BOARD, GENERAL**

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

**2.3 INTERIOR GYPSUM BOARD**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. American Gypsum.
  2. Georgia-Pacific Gypsum LLC.
  3. Lafarge North America Inc.
  4. National Gypsum Company.
  5. USG Corporation.
- B. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
1. Core: 15.9 mm (5/8 inch), Type X.
  2. Long Edges: Tapered.
  3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- C. Paper-Less Gypsum Board:
1. Core: 15.9 mm (5/8 inch), Type X
  2. For use in Electrical Room – walls and ceiling.
  3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

**2.4 TRIM ACCESSORIES**

- A. Interior Trim: ASTM C 1047.
1. Material: Paper-faced galvanized steel sheet.
  2. Shapes:
    - a. Cornerbead.
    - b. U-Bead: J-shaped; exposed short flange does not receive joint compound. Use at joints with other materials, including window frames.

**2.5 JOINT TREATMENT MATERIALS**

- A. General: Comply with ASTM C 475/C 475M.

- B. Joint Tape:
1. Paper-Less Gypsum Board: Fabric tape.
  2. All Other Interior Gypsum Board: Paper.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
  2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
    - a. Use setting-type compound for installing paper-faced metal trim accessories.
  3. Fill Coat: For second coat, use drying-type, all-purpose compound.
  4. Finish Coat: For third coat, use drying-type, all-purpose compound.
- D. Joint Compound for Tile Backing Panels:
1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

## 2.6 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.84 to 2.84 mm (0.033 to 0.112 inch) thick.
  2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
- D. 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: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
    - b. Grabber Construction Products; Acoustical Sealant GSC.
    - c. Pecora Corporation; AC-20 FTR.
    - d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
    - e. USG Corporation; SHEETROCK Acoustical Sealant.
- E. Thermal Insulation: As specified in Section 07 21 00 "Thermal Insulation."

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 APPLYING AND FINISHING PANELS, GENERAL**

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1.5 mm (1/16 inch) of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 0.7 sq. m (8 sq. ft.) in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 6.4- to 9.5-mm- (1/4- to 3/8-inch-) wide joints to install sealant.
- F. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- G. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.
  - 1. Install sound insulation around exam rooms, toilet rooms, and offices, and as indicated on drawings.

**3.3 APPLYING INTERIOR GYPSUM BOARD**

- A. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated. Ceiling gypsum panels shall be fastened to wood ceiling joists @16" o.o. maximum.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
  - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
  - b. At base of all walls, hold gypsum board panels 1/8" to 1/4" off slab - typical.
3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

### 3.4 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Interior Trim: Install in the following locations:
  1. Cornerbead: Use at outside corners.
  2. J-Bead: Use at edges of gypsum board, including where adjacent to window frames.

### 3.5 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
  1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
  2. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
    - a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."
- E. Glass-Mat Faced Panels: Level 5 finish, in according to manufacturer's written instructions.

### 3.6 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

**END OF SECTION 09 29 00**

## SECTION 09 30 00 - TILING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Ceramic tile floor and base.
  - 2. Stone thresholds.
  - 3. Crack isolation membrane.
- B. Related Sections:
  - 1. Section 09 29 00 "Gypsum Board" for glass-mat, water-resistant backer board.

#### 1.3 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile."
- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
  - 1. Level Surfaces: Minimum 0.6.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required.
2. Full-size units of each type of trim and accessory for each color and finish required.
3. Stone thresholds in 150-mm (6-inch) lengths.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Product Certificates: For each type of product, signed by product manufacturer.

#### 1.7 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.
  1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
  1. Stone thresholds.
  2. Crack isolation membrane.
  3. Joint sealants.
- D. Preinstallation Conference: Conduct conference at Project site.
  1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- C. Store liquid materials in unopened containers and protected from freezing.

#### 1.9 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

## PART 2 - PRODUCTS

### 2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
  - 1. Provide tile complying with Standard grade requirements unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

### 2.2 TILE PRODUCTS

- A. Ceramic Tile: Factory-mounted unglazed ceramic mosaic tile.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Olean; a division of Dal-Tile Corporation.
    - b. Crossville, Inc.
    - c. Daltile.
  - 2. Composition: Vitreous or impervious natural clay or porcelain.
  - 3. Certification: Porcelain tile certified by the Porcelain Tile Certification Agency.
  - 4. Module Size: 2 by 2 inches (50.8 by 50.8 mm).
  - 5. Thickness: 1/4 inch (6.4 mm).
  - 6. Face: Plain with cushion edges.
  - 7. Surface: Smooth, without abrasive admixture.
  - 8. Dynamic Coefficient of Friction: Not less than 0.42.
  - 9. Finish: Mat, opaque, clear glaze.
  - 10. Tile Colors and Patterns: As selected by Architect from manufacturer's full range.
  - 11. Grout Color: As selected by Architect from manufacturer's full range.
  - 12. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
    - a. Base Cove: Cove, module size 2 by 1 inch (50.8 by 25.4 mm).

### 2.3 THRESHOLDS

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1.5 mm (1/16 inch) above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 12.7 mm (1/2 inch) or less above adjacent floor surface.

B. Marble Thresholds: ASTM C 503, with a minimum abrasion resistance of 10 per ASTM C 1353 or ASTM C 241 and with honed finish.

1. Description: Uniform, fine- to medium-grained white stone with gray veining.

## 2.4 CRACK ISOLATION MEMBRANE

A. General: Manufacturer's standard product that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and fabric reinforcement.

1. Products: Subject to compliance with requirements, provide the following:

- a. Laticrete International, Inc.; Laticrete Blue 92 Anti-Fracture Membrane.

## 2.5 SETTING MATERIALS

A. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.

1. Manufacturers: Subject to compliance with requirements, provide the following:

- a. Laticrete International, Inc.

2. Provide prepackaged, dry-mortar mix combined with acrylic resin liquid-latex additive at Project site.

3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

## 2.6 GROUT MATERIALS

A. Polymer-Modified Tile Grout: ANSI A118.7.

1. Manufacturers: Subject to compliance with requirements, provide the following:

- a. Laticrete International, Inc.

2. Polymer Type: Acrylic resin in liquid-latex form for addition to prepackaged dry-grout mix.

## 2.7 ELASTOMERIC SEALANTS

A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Section 07 92 00 "Joint Sealants."

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.

- C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation; Dow Corning 786.
    - b. GE Silicones; a division of GE Specialty Materials; Sanitary 1700.
    - c. Laticrete International, Inc.; Lataasil Tile & Stone Sealant.
    - d. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.

## 2.8 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Bonsal American; an Oldcastle company; Grout Sealer.
    - b. Bostik, Inc.; CeramaSeal Grout & Tile Sealer.
    - c. C-Cure; Penetrating Sealer 978.
    - d. Custom Building Products; Grout Sealer.
    - e. Jamo Inc.; Matte Finish Sealer.
    - f. MAPEI Corporation; KER 003, Silicone Spray Sealer for Cementitious Tile Grout.
    - g. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
    - h. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.

## 2.9 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.

2. Verify that concrete substrates for tile floors installed with thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
    - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
  3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
  4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1:50 (1/4 inch per foot) toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

### 3.3 TILE INSTALLATION

- A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
  1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
    - a. Tile floors composed of tiles 200 by 200 mm (8 by 8 inches) or larger.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
  1. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.

2. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
1. Paver Tile: 3.175 mm (1/8 inch).
- G. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
  2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."
- I. Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.
1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in latex-portland cement mortar (thin set).
  2. Do not extend crack isolation membrane under thresholds set in latex-portland cement mortar. Fill joints between such thresholds and adjoining tile set on crack isolation membrane with elastomeric sealant.
- J. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

### 3.4 CRACK ISOLATION MEMBRANE INSTALLATION

- A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.
- B. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

### 3.5 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  1. Remove latex-portland cement grout residue from tile as soon as possible.
  2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
- B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

### 3.6 INTERIOR TILE INSTALLATION SCHEDULE

#### A. Interior Floor Installations, Concrete Subfloor:

1. Tile Installation F113: Thin-set mortar; TCA F113.
  - a. Tile Type: Paver tile.
  - b. Thin-Set Mortar: Medium-bed, latex- portland cement mortar.
  - c. Grout: Polymer-modified sanded grout.

#### B. Interior Wall Base Installations, Metal Studs or Furring:

1. Tile Installation W245: Thin-set mortar on coated glass-mat, water-resistant gypsum backer board; TCA W245.
  - a. Tile Type: Paver tile.
  - b. Thin-Set Mortar: Latex- portland cement mortar.
  - c. Grout: Polymer-modified sanded grout.
  - d. 6" high base, or as indicated on drawings.

END OF SECTION 09 30 00

## SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for ceilings.

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 150 mm (6 inches) in size.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
  - 1. Acoustical Panel: Set of 150-mm- (6-inch-) square Samples of each type, color, pattern, and texture.
  - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 150-mm- (6-inch-) long Samples of each type, finish, and color.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Suspended ceiling components.
  - 2. Structural members to which suspension systems will be attached.
  - 3. Size and location of initial access modules for acoustical panels.
  - 4. Items penetrating finished ceiling including the following:
    - a. Lighting fixtures.
    - b. Air outlets and inlets.
    - c. Speakers.
    - d. Sprinklers.
    - e. Access panels.
  - 5. Perimeter moldings.

- B. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.
- C. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.

## 1.6 WARRANTY

- A. Manufacturer's 30-year system warranty against visible sag, and mold/ mildew/ bacterial growth.

## 1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

## 1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Acoustical Ceiling Panels: Full-size panels equal to 2 percent of quantity installed, or no less than 2 cases.

## 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

## 1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
  - 2. Smoke-Developed Index: 50 or less.

## 2.2 ACOUSTICAL PANELS, GENERAL

- A. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system from single source from single manufacturer.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.
  - 1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 400 mm (15-3/4 inches) away from test surface according to ASTM E 795.
- C. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
  - 1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

## 2.3 ACOUSTICAL PANELS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries, Inc.; 1910 Ultima or comparable product by one of the following:
  - 1. CertainTeed Corp.
  - 2. Chicago Metallic Corporation.
  - 3. USG Interiors, Inc.; Subsidiary of USG Corporation.
- B. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern as follows:
  - 1. Type and Form: Type III, mineral base with painted finish; Form 1, nodular.
  - 2. Pattern: Fine textured.
- C. Color: White.
- D. LR: Not less than 0.90.
- E. NRC: Not less than 0.70.
- F. CAC: Not less than 35.
- G. Edge/Joint Detail: Square.
- H. Thickness: 19 mm (3/4 inch).
- I. Modular Size: 610 by 610 mm (24 by 24 inches).
- J. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

## 2.4 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.
- B. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- C. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
  - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
  - 2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 2.69-mm- (0.106-inch-) diameter wire.
- D. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 610 mm (24 inches) o.c. on all cross tees.

## 2.5 METAL SUSPENSION SYSTEM

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries, Inc.; 15/16 inch Prelude ML or comparable product by one of the following:
  - 1. CertainTeed Corp.
  - 2. Chicago Metallic Corporation.
  - 3. USG Interiors, Inc.; Subsidiary of USG Corporation.
- B. Exposed-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than Z90 (G30) coating designation; with prefinished 21-mm- (15/16-inch-) wide metal caps on flanges.

## 2.6 METAL EDGE MOLDINGS AND TRIM

- A. Manufacturers: Subject to compliance with requirements, provide metal edge moldings by same manufacturer of ceiling panels.
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
  - 1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.

## 2.7 ACOUSTICAL SEALANT

- A. Products: Subject to compliance with requirements, provide one of the following:
  - 1. Acoustical Sealant for Exposed and Concealed Joints:
    - a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
    - b. USG Corporation; SHEETROCK Acoustical Sealant.

2. Acoustical Sealant for Concealed Joints:
  - a. Henkel Corporation; OSI Pro-Series SC-175 Acoustical Sound Sealant.
  - b. Pecora Corporation; AIS-919.
  - c. Tremco, Inc.; Tremco Acoustical Sealant.
- B. Acoustical Sealant: Manufacturer's standard sealant complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
  1. Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant.
  2. Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

#### 3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
  1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.
- B. Suspend ceiling hangers from building's structural members and as follows:
  1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are

- secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
  6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  7. Space hangers not more than 1200 mm (48 inches) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 200 mm (8 inches) from ends of each member.
  8. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
  2. Screw attach moldings to substrate at intervals not more than 400 mm (16 inches) o.c. and not more than 75 mm (3 inches) from ends, leveling with ceiling suspension system to a tolerance of 3.2 mm in 3.6 m (1/8 inch in 12 feet). Miter corners accurately and connect securely.
  3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. Arrange directionally patterned acoustical panels as follows:
    - a. Install panels with pattern running in one direction parallel to long axis of space.
  2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
  3. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction; space as recommended by panel manufacturer's written instructions unless otherwise indicated.

### 3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

## SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Resilient cove base.
  - 2. Resilient moldings.
- B. Related Sections:
  - 1. Section 09 65 19 "Resilient Tile Flooring."

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 300 mm (12 inches) long.

#### 1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Furnish not less than 3 linear m (10 linear feet) for every 150 linear m (500 linear feet) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 10 deg C (50 deg F) or more than 32 deg C (90 deg F).

#### 1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 21 deg C (70 deg F) or more than 35 deg C (95 deg F), in spaces to receive resilient products during the following time periods:
  - 1. 48 hours before installation.

2. During installation.
  3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 13 deg C (55 deg F) or more than 35 deg C (95 deg F).
- C. Install resilient products after other finishing operations, including painting, have been completed.

## PART 2 - PRODUCTS

### 2.1 THERMOSET-RUBBER BASE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Burke Mercer Flooring Products, Division of Burke Industries Inc.
  2. Flexco.
  3. Johnsonite; A Tarkett Company.
  4. Roppe Corporation, USA.
- B. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
- C. Thickness: 3.2 mm (0.125 inch).
- D. Height: 4 inch cove base.
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Preformed.
- G. Inside Corners: Preformed.
- H. Colors: As selected by Architect from Manufacturer's full range.

### 2.2 RUBBER MOLDING ACCESSORY

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Roppe Corporation, USA.
  2. VPI, LLC, Floor Products Division.
- B. Description: Rubber joiner for tile and carpet.
- C. Profile and Dimensions: As indicated.
- D. Locations: Provide rubber molding accessories in areas indicated.
- E. Colors and Patterns: As selected by Architect from Manufacturer's full range.

## 2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are the same temperature as the space where they are to be installed.
  - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

### 3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.

- F. Preformed Corners: Install preformed corners before installing straight pieces.

### **3.4 RESILIENT ACCESSORY INSTALLATION**

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

### **3.5 CLEANING AND PROTECTION**

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

**END OF SECTION 09 65 13**

## SECTION 09 65 16 - RESILIENT SHEET FLOORING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes vinyl sheet flooring, integral cove base, and heat-welded seams.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of flooring. Include flooring layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
- C. Samples: For each exposed product and for each color and texture specified in manufacturer's standard size, but not less than 150-by-230-mm (6-by-9-inch) sections.
  - 1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 230 mm (9 inches) long, of each color required.
- D. Welded-Seam Samples: For seamless-installation technique indicated and for each resilient sheet flooring product, color, and pattern required; with seam running lengthwise and in center of 150-by-230-mm (6-by-9-inch) Sample applied to a rigid backing and prepared by Installer for this Project.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of resilient sheet flooring to include in maintenance manuals.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for resilient sheet flooring installation and seaming method indicated.
  - 1. Engage an installer who employs workers for this Project who are trained or certified by resilient sheet flooring manufacturer for installation techniques required.

- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockups for resilient sheet flooring including integral resilient cove base and accessories.
    - a. Size: Minimum 9.3 sq. m (100 sq. ft.).
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient sheet flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 10 deg C (50 deg F) or more than 32 deg C (90 deg F). Store rolls upright.

## 1.8 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 21 deg C (70 deg F) or more than 29 deg C (85 deg F), in spaces to receive resilient sheet flooring during the following time periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer.
- C. Close spaces to traffic during resilient sheet flooring installation.
- D. Close spaces to traffic for 48 hours after resilient sheet flooring installation.
- E. Install resilient sheet flooring after other finishing operations, including painting, have been completed.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient sheet flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

### 2.2 UNBACKED VINYL SHEET FLOORING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Armstrong World Industries, Inc.

2. Johnsonite; A Tarkett Company.
  3. Mannington Mills, Inc.
- B. Product Standard: ASTM F 1913.
- C. Thickness: 2.0 mm (0.080 inch).
- D. Wearing Surface: As selected by Architect from Manufacturer's full range.
- E. Sheet Width: As standard with manufacturer.
- F. Seamless-Installation Method: Heat welded.
- G. Colors and Patterns: As selected by Architect from full range of industry colors.

### 2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit resilient sheet flooring and substrate conditions indicated.
1. Adhesives shall have a VOC content of 50 g/L or less.
- C. Seamless-Installation Accessories:
1. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.
    - a. Color: Match flooring.
- D. Integral-Flash-Cove-Base Accessories:
1. Cove Strip: 25-mm (1-inch) radius provided or approved by resilient sheet flooring manufacturer. Provide full built-up support behind cove base.
  2. Cap Strip: Square metal, vinyl, or rubber cap provided or approved by resilient sheet flooring manufacturer.
  3. Corners: Heat-welded seam, with full support behind joints.
- E. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient sheet flooring manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient sheet flooring.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare substrates according to resilient sheet flooring manufacturer's written instructions to ensure adhesion of resilient sheet flooring.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by resilient sheet flooring manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by resilient sheet flooring manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing.
  - 4. Moisture Testing: Proceed with installation only after substrates pass testing according to resilient sheet flooring manufacturer's written recommendations, but not less stringent than the following:
    - a. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient sheet flooring until it is the same temperature as the space where it is to be installed.
  - 1. At least 48 hours in advance of installation, move flooring and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient sheet flooring.

### 3.3 RESILIENT SHEET FLOORING INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient sheet flooring.
- B. Unroll resilient sheet flooring and allow it to stabilize before cutting and fitting.
- C. Lay out resilient sheet flooring as follows:
  - 1. Maintain uniformity of flooring direction.
  - 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 152 mm (6 inches) away from parallel joints in flooring substrates.
  - 3. Match edges of flooring for color shading at seams.
  - 4. Avoid cross seams.
- D. Scribe and cut resilient sheet flooring to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, and door frames.
- E. Extend resilient sheet flooring into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on resilient sheet flooring as marked on substrates. Use chalk or other nonpermanent marking device.

- G. Adhere resilient sheet flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- H. Seamless Installation:
  - 1. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and heat weld with welding bead to permanently fuse sections into a seamless flooring. Prepare, weld, and finish seams to produce surfaces flush with adjoining flooring surfaces.
- I. Integral-Flash-Cove Base: Cove resilient sheet flooring 152 mm (6 inches) up vertical surfaces. Support flooring at horizontal and vertical junction with cove strip. Butt at top against cap strip.

### 3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient sheet flooring.
- B. Perform the following operations immediately after completing resilient sheet flooring installation:
  - 1. Remove adhesive and other blemishes from surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient sheet flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, adhesive, and blemishes from flooring surfaces before applying liquid floor polish.
  - 1. Apply four coats.
- E. Cover resilient sheet flooring until Substantial Completion.

**END OF SECTION 09 65 16**



## SECTION 09 65 19 - RESILIENT TILE FLOORING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Vinyl composition floor tile.
- B. Related Sections:
  - 1. Section 09 65 13 "Resilient Base and Accessories."

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Verification: Full-size units of each color and pattern of floor tile required.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

#### 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 10 deg C (50 deg F) or more than 32 deg C (90 deg F). Store floor tiles on flat surfaces.

## 1.9 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 21 deg C (70 deg F) or more than 35 deg C (95 deg F), in spaces to receive floor tile during the following time periods:
  1. 48 hours before installation.
  2. During installation.
  3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 13 deg C (55 deg F) or more than 35 deg C (95 deg F).
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

## PART 2 - PRODUCTS

### 2.1 VINYL COMPOSITION FLOOR TILE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Armstrong World Industries, Inc.
  2. Congoleum Corporation.
  3. Mannington Mills, Inc.
- B. Tile Standard: ASTM F 1066, Class 2, through-pattern tile.
- C. Wearing Surface: Smooth.
- D. Thickness: 3.2 mm (0.125 inch).
- E. Size: 305 by 305 mm (12 by 12 inches).
- F. Colors: As selected by Architect from Manufacturer's full range.

### 2.2 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
  - 4. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:
    - a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 1.36 kg of water/92.9 sq. m (3 lb of water/1000 sq. ft.) in 24 hours.
    - b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until they are the same temperature as the space where they are to be installed.
  - 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

### **3.3 FLOOR TILE INSTALLATION**

- A. Comply with manufacturer's written instructions for installing floor tile.

- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
  - 1. Lay tiles square with room axis, parallel with corridor.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
  - 1. Lay tiles with grain running in one direction.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

### 3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
  - 1. Apply four (4) coats.
- E. Joint Sealant: Apply sealant to resilient floor tile perimeter and around columns, at door frames, and at other joints and penetrations.
- F. Cover floor tile until Substantial Completion.

END OF SECTION 09 65 19

## SECTION 09 91 13 - EXTERIOR PAINTING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following exterior substrates:
  - 1. Galvanized metal.
  - 2. Wood.
  - 3. Fiber-cement siding.
  - 4. Fiberglass fabrications.
- B. Related Requirements:
  - 1. Section 05 12 00 "Structural Steel Framing" for shop priming of metal substrates with primers specified in this Section.
  - 2. Section 09 91 23 "Interior Painting" for surface preparation and the application of paint systems on interior substrates.

#### 1.3 DEFINITIONS

- A. Gloss Level 3: (Eggshell) 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 4: (Low Sheen) 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 5: (Semi-gloss) 35 to 70 units at 60 degrees, according to ASTM D 523.
- D. Gloss Level 6: (Gloss) 70 to 85 units at 60 degrees, according to ASTM D 523.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
  - 1. Submit Samples on rigid backing, 200 mm (8 inches) square.
  - 2. Step coats on Samples to show each coat required for system.
  - 3. Label each coat of each Sample.
  - 4. Label each Sample for location and application area.

- D. Product List: For each product indicated, include the following:
1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
  2. Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
  3. VOC content.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Paint: 5 percent, but not less than 3.8 L (1 gal.) of each material and color applied.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 7 deg C (45 deg F).
1. Maintain containers in clean condition, free of foreign materials and residue.
  2. Remove rags and waste from storage areas daily.

#### 1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 10 and 35 deg C (50 and 95 deg F).
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 3 deg C (5 deg F) above the dew point; or to damp or wet surfaces.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Benjamin Moore & Co.
  2. ICI Paints.
  3. PPG Architectural Finishes, Inc.
  4. Sherwin-Williams Company (The).

#### 2.2 PAINT, GENERAL

- A. Material Compatibility:
1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

- B. Basis of Design: Products listed for each application are for reference as a basis of design.
- C. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.
- D. Colors: As indicated in a color schedule, to match Architect's samples.

### 2.3 PRIMERS/SEALERS

- A. Primer, Bonding, Water Based: SW Multi-Purpose Latex Primer/ Sealer.

### 2.4 METAL PRIMERS

- A. Primer, Galvanized, Water Based: SW DTM Acrylic Primer.

### 2.5 WOOD AND FIBER-CEMENT SIDING PRIMERS

- A. Primer, Latex for Exterior Wood and Fiber-Cement Siding: SW Oil-Based Wood Primer.

### 2.6 WATER-BASED PAINTS

- A. Latex, Exterior Low Sheen (Gloss Level 3): SW Resilience Exterior Latex Coating.
- B. Latex, Exterior Semi-Gloss (Gloss Level 5): SW Resilience Exterior Latex Coating.
- C. Latex, Exterior, Gloss (Gloss Level 6): SW Resilience Exterior Latex Coating.

### 2.7 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
  - 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
  - 2. Testing agency will perform tests for compliance with product requirements.
  - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Wood: 15 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

**3.2 PREPARATION**

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- E. Wood and Fiber-Cement Siding Substrates:
  - 1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
  - 2. Sand surfaces that will be exposed to view, and dust off.
  - 3. Prime edges, ends, faces, undersides, and backsides of wood.
  - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- F. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
  - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
  - 4. Paint entire exposed surface of window frames and sashes.
  - 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  - 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

### 3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
  - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
  - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

### 3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.6 EXTERIOR PAINTING SCHEDULE

- A. Metal and Galvanized-Metal Substrates:
  - 1. Latex System:

- a. Prime Coat: Primer, galvanized, water based.
  - b. Intermediate Coat: Latex, exterior, matching topcoat.
  - c. Topcoat: Latex, exterior gloss (Gloss Level 6).
- B. Wood Substrates: Including wood trim and fiber-cement siding.
- 1. Latex System:
    - a. Prime Coat: Primer, oil-based for exterior wood.
    - b. Intermediate Coat: Latex, exterior, matching topcoat.
    - c. Topcoat: Latex, exterior semi-gloss (Gloss Level 5).
- C. Plastic Trim Fabrication Substrates:
- 1. Latex System:
    - a. Prime Coat: Primer, bonding, water based.
    - b. Intermediate Coat: Latex, exterior, matching topcoat.
    - c. Topcoat: Latex, exterior, low sheen (Gloss Level 3-4).

**END OF SECTION 09 91 13**

## SECTION 09 91 23 - INTERIOR PAINTING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
  - 1. Concrete.
  - 2. Steel.
  - 3. Galvanized metal.
  - 4. Wood.
  - 5. Gypsum board.
- B. Related Requirements:
  - 1. Section 09 91 13 "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.

#### 1.3 DEFINITIONS

- A. Gloss Level 1: (Flat) Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 3: (Eggshell) 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 5: (Semi-gloss) 35 to 70 units at 60 degrees, according to ASTM D 523.
- D. Gloss Level 6: (Gloss) 70 to 85 units at 60 degrees, according to ASTM D 523.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Product List: For each product indicated, include the following:
  - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
  - 2. VOC content.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 3.8 L (1 gal.) of each material and color applied.

## 1.6 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
    - a. Vertical and Horizontal Surfaces: Provide samples of at least 9 sq. m (100 sq. ft.).
    - b. Other Items: Architect will designate items or areas required.
  2. Final approval of color selections will be based on mockups.
    - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
  3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 7 deg C (45 deg F).
  1. Maintain containers in clean condition, free of foreign materials and residue.
  2. Remove rags and waste from storage areas daily.

## 1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 10 and 35 deg C (50 and 95 deg F).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 3 deg C (5 deg F) above the dew point; or to damp or wet surfaces.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Benjamin Moore & Co.
  2. ICI Paints.
  3. PPG Architectural Finishes, Inc.
  4. Sherwin-Williams Company (The).

## 2.2 PAINT, GENERAL

- A. Material Compatibility:
  - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Basis of Design: Products listed for each application are for reference as basis of design.
- C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction.
- D. Colors: As indicated in a color schedule, to match Architect's samples.

## 2.3 PRIMERS/SEALERS

- A. Primer Sealer, Latex, Interior: SW B28W08200.
- B. Primer, Latex, for Interior Wood: SW B28W08200.
- C. Primer, Bonding, Water Based: SW PrepRite ProBlock Latex Sealer.

## 2.4 METAL PRIMERS

- A. Primer, Alkyd, Anti-Corrosive, for Metal: SW Kem Kromik Universal Metal Primer.
- B. Primer, Galvanized, Water Based: SW DTM Acrylic Primer.

## 2.5 WATER-BASED PAINTS

- A. Latex, Interior, Flat, (Gloss Level 1): SW ProMar 200.
- B. Latex, Interior, (Gloss Level 3): SW ProMar 200.
- C. Latex, Interior, Semi-Gloss, (Gloss Level 5): SW ProMar 200.
- D. Latex, Interior, Gloss, (Gloss Level 6, except minimum gloss of 65 units at 60 degrees): SW ProMar 200.

## 2.6 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
  - 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
  - 2. Testing agency will perform tests for compliance with product requirements.
  - 3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site,

pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Concrete: 12 percent.
  - 2. Wood: 15 percent.
  - 3. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

#### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
- F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

- G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- H. Wood Substrates:
  - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
  - 2. Sand surfaces that will be exposed to view, and dust off.
  - 3. Prime edges, ends, faces, undersides, and backsides of wood.
  - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

### 3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
  - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
  - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

### 3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.6 INTERIOR PAINTING SCHEDULE

- A. Steel Substrates:
  - 1. Latex over Alkyd Primer System:
    - a. Prime Coat: Primer, alkyd, anti-corrosive, for metal.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior, gloss, (Gloss Level 6, except minimum gloss of 65 units at 60 degrees).
- B. Galvanized-Metal Substrates:
  - 1. Latex over Waterborne Primer System:
    - a. Prime Coat: Primer, galvanized, water based.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior, gloss, (Gloss Level 6, except minimum gloss of 65 units at 60 degrees).
- C. Wood Substrates: Including wood trim.
  - 1. Latex System:
    - a. Prime Coat: Primer, latex, for interior wood.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior, semi-gloss, (Gloss Level 5).
- D. Fiberglass and Plastic Substrates:
  - 1. Latex System:
    - a. Prime Coat: Primer, bonding, water based.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior, (Gloss Level 3).
- E. Gypsum Board Substrates:
  - 1. Latex System:
    - a. Prime Coat: Primer sealer, latex, interior.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior, flat, (Gloss Level 1), for ceilings.
    - d. Topcoat: Latex, interior, (Gloss Level 3), for walls.

END OF SECTION 09 91 23

## SECTION 09 93 00 - STAINING AND TRANSPARENT FINISHING

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

- A. Submittals:
  - 1. Product Data.
  - 2. Samples.
- B. Coordination: Coordinate with factory finished doors and other pre-finished materials in other sections.
- C. Mockups: Full-coat finish Sample of each type of coating, color, and substrate, applied where directed.
- D. Extra Materials: Deliver to Owner 0.9 L (1 quart) of each color and type of stain and transparent finish used on Project, in containers, properly labeled and sealed.

### PART 2 - PRODUCTS

#### 2.1 STAINED AND TRANSPARENT FINISHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Benjamin Moore & Co.
  - 2. BLP Mobile Paint Manufacturing.
  - 3. Dulux (formerly ICI Paints); a brand of AkzoNobel.
  - 4. Sherwin-Williams Company (The).
- B. MPI Standards: Provide materials that comply with MPI standards indicated and listed in its "MPI Approved Products List."
  - 1. Wood Filler Paste: MPI #91.
  - 2. Alkyd, Sanding Sealer, Clear: MPI #102.
  - 3. Stain, Semitransparent, for Interior Wood: MPI #90.
  - 4. Varnish, Interior, Polyurethane, Oil Modified, Satin (Gloss Level 4): MPI #57.
- C. Material Compatibility: Provide materials that are compatible with one another and with substrates.
  - 1. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- D. Colors: As selected by Architect.

**PART 3 - EXECUTION****3.1 PREPARATION**

- A. Comply with recommendations in MPI's "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove hardware, lighting fixtures, and similar items that are not to be finished. Mask items that cannot be removed. Reinstall items in each area after finishing is complete.
- C. Clean and prepare surfaces in an area before beginning finishing in that area. Schedule finishing so cleaning operations will not damage newly finished surfaces.

**3.2 APPLICATION**

- A. Comply with recommendations in MPI's "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Finish exposed surfaces unless otherwise indicated.
- C. Apply stains and transparent finishes according to manufacturer's written instructions.
- D. Apply stains and transparent finishes to produce surface films without color irregularity, cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other imperfections. Use multiple coats to produce a smooth surface film of even luster.

**3.3 INTERIOR STAIN AND CLEAR FINISH APPLICATION SCHEDULE**

- A. Wood substrates, nontraffic surfaces, including wood trim, architectural woodwork, doors, and wood-based panel products.
  - 1. Semitransparent Stain: Two coats: MPI INT 6.1G
  - 2. Satin Oil-Modified Polyurethane Varnish over Stain: Three coats over stain: MPI INT 6.1J.

**END OF SECTION 09 93 00**

## SECTION 10 14 23 - SIGNAGE

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Room-identification signs, for all interior rooms.
  - 2. Exterior panel signs.
  - 3. Exterior monument signs.
  - 4. Handicapped parking signs and posts.

#### 1.3 DEFINITIONS

- A. Accessible: In accordance with the accessibility standard.

#### 1.4 COORDINATION

- A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.
- B. Furnish templates for placement of electrical service embedded in permanent construction by other installers.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For panel signs.
  - 1. Include fabrication and installation details and attachments to other work.
  - 2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
  - 3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.
- C. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
  - 1. Room-Identification Signs: Full-size Sample.
- D. Sign Schedule: Use same designations specified or indicated on Drawings or in a sign schedule.
  - 1. Certify that all interior room signs and exterior panel signs are handicapped compliant.

## 1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
    - a. Deterioration of finishes beyond normal weathering.
    - b. Deterioration of embedded graphic image.
    - c. Separation or delamination of sheet materials and components.
  2. Warranty Period: Five years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs.

### 2.2 SIGNS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. APCO Graphics, Inc.
  2. ASE, Inc.
  3. ASI Sign Systems, Inc.
  4. Best Sign Systems Inc.
- B. Room-Identification Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles.
1. Sign-Panel Perimeter: Finish edges smooth.
    - a. Edge Condition: Square cut.
    - b. Corner Condition in Elevation: Square.
  2. Mounting: with adhesive.
  3. Text and Typeface: Accessible raised characters and Braille typeface matching Architect's sample. Finish raised characters to contrast with background color, and finish Braille to match background color.
  4. Provide room-identification sign for each interior room.
- C. Exterior Panel Signs: Signs with background texture, border, braille, and characters having uniform faces, sharp corners, and precisely formed lines and profiles, and as follows:
1. Sign Material: Cast aluminum or zinc.
  2. Sign Size: 8" x 4" with .25" border for room identification signs, except 8" x 8" with .25 border for restroom identification signs. Reference drawings for directional and information signs..
  3. Sign Thickness: 0.25 inch (6.35 mm).
  4. Sign Finish: Baked-Enamel or Powder-Coated Finish. White border, braille, and characters, with background colors as selected from manufacturer's full range.
  5. Background texture: As selected from manufacturer's full range.

6. Text and Typeface: Accessible raised characters and braille (at least 1/32" high). All upper case sans serif lettering in compliance with accessibility standards. Reference drawings for text, each location and each room.
7. Graphics: Accessible standard handicapped and male/ female graphics for restrooms.
8. Mounting: Concealed studs into stucco walls. Set in full bed of silicone sealant.

### 2.3 PANEL-SIGN MATERIALS

- A. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
- B. Vinyl Film: UV-resistant vinyl film of nominal thickness indicated, with pressure-sensitive, permanent adhesive on back; die cut to form characters or images as indicated and suitable for exterior applications.
- C. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.
- D. Aluminum Castings: ASTM B 26/B 26M, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- E. Zinc Castings: ASTM B 69, alloy and temper recommended by sign producer and finisher for type of use and finish indicated.

### 2.4 HANDICAPPED PARKING SIGNS

- A. Sign: Painted aluminum sheet.
- B. Size: 12" x 18" with handicapped verbiage, including "Van Accessible" and handicapped symbol.
- C. Mounting: Mount sign on 2" x 2" galvanized steel post, set in concrete. Use stainless steel fasteners.
- D. Mounting Height: Bottom of sign to be 60" above finished grade.

### 2.5 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:
  1. Use concealed fasteners and anchors unless indicated to be exposed.
- B. Adhesives: As recommended by sign manufacturer and with a VOC content of 70 g/L or less for adhesives used inside the weatherproofing system and applied on-site when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

### 2.6 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
- B. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.

## 2.7 GENERAL FINISH REQUIREMENTS

- A. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
  - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
  - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
  - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Room-Identification Signs: Install in locations on walls as indicated and according to accessibility standard.
- C. Mounting Methods:
  - 1. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.

### 3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 10 14 23

## SECTION 10 28 00 - TOILET, BATH, AND LAUNDRY ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Public-use washroom accessories.
  - 2. Childcare accessories.
  - 3. Underlavatory guards.
  - 4. Custodial accessories.
- B. Related Sections:
  - 1. Section 06 10 00 "Rough Carpentry" for concealed wood blocking.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include the following:
  - 1. Construction details and dimensions.
  - 2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
  - 3. Material and finish descriptions.
  - 4. Features that will be included for Project.
  - 5. Manufacturer's warranty.
- B. Samples: Full size, for each accessory item to verify design, operation, and finish requirements.
  - 1. Approved full-size Samples will be returned and may be used in the Work.
- C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
  - 1. Identify locations using room designations indicated.
  - 2. Identify products using designations indicated.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

**1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

**1.6 QUALITY ASSURANCE**

- A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

**1.7 COORDINATION**

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

**1.8 WARRANTY**

- A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: 15 years from date of Substantial Completion.

**PART 2 - PRODUCTS****2.1 MATERIALS**

- A. Stainless Steel: ASTM A 666, Type 304, 0.8-mm (0.031-inch) minimum nominal thickness unless otherwise indicated.
- B. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- C. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- D. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- E. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

**2.2 PUBLIC-USE WASHROOM ACCESSORIES**

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products by Bobrick Washroom Equipment, Inc. indicated below or comparable products by one of the following:
  - 1. American Specialties, Inc.
  - 2. Bradley Corporation.
  - 3. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
  - 4. A&J Washroom Accessories, Inc.

- B. Toilet Tissue (Roll) Dispenser:
1. Basis-of-Design Product: B-2730.
  2. Description: Single-roll dispenser.
  3. Mounting: Surface mounted.
  4. Operation: Theft-resistant plastic spindles with concealed locking device; core cannot be removed until roll is empty. No controlled delivery.
  5. Capacity: Designed for 4-1/2 to 6" diameter tissue rolls.
  6. Material and Finish: Cast aluminum, satin finish.
- C. Combination Towel (Folded) Dispenser/ Waste Receptacle:
1. Basis-of-Design Product: B3944.
  2. Description: Combination unit for dispensing C-fold or multifold towels, with removable waste receptacle.
  3. Mounting: Recessed.
    - a. Designed for nominal 100-mm (4-inch) wall depth.
  4. Minimum Towel-Dispenser Capacity: 600 C-fold or 800 multifold paper towels.
  5. Minimum Waste-Receptacle Capacity: 45.4 L (12 gal.).
  6. Material and Finish: Stainless steel, No. 4 finish (satin).
  7. Liner: Reusable, vinyl waste-receptacle liner.
  8. Lockset: Tumbler type for towel-dispenser compartment.
- D. Towel Dispenser:
1. Basis-of-Design Product: B-262.
  2. Mounting: Surface-mounted.
  3. Capacity: Minimum 400 c-fold or 525 multi-fold towels.
  4. Hardware: Tumbler lock with piano hinge. Hemmed towel tray opening.
  5. Material and Finish: Stainless steel, No. 4 finish (satin).
- E. Liquid-Soap Dispenser:
1. Basis-of-Design Product: B-2111.
  2. Description: Designed for dispensing soap in liquid or lotion form.
  3. Mounting: Vertically oriented, surface mounted.
  4. Capacity: 1.2 mL (40 oz.).
  5. Materials: Stainless steel.
  6. Lockset: Tumbler type.
  7. Refill Indicator: Window type.
- F. Grab Bar:
1. Basis-of-Design Product: B-6806.
  2. Mounting: Flanges with concealed fasteners.
  3. Material: Stainless steel, 1.3 mm (0.05 inch) thick.
    - a. Finish: Smooth, No. 4 finish (satin).
  4. Outside Diameter: 31 mm (1-1/4 inches).
  5. Configuration and Length: Straight, 914 and 1066 mm (36 and 42 inches) long.

## G. Sanitary-Napkin Disposal Unit:

1. Basis-of-Design Product: B-270.
2. Mounting: Surface mounted.
3. Door or Cover: Self-closing, disposal-opening cover.
4. Receptacle: Removable.
5. Material and Finish: Stainless steel, No. 4 finish (satin).

## H. Mirror Unit:

1. Basis-of-Design Product: B-1556.
2. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
  - a. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
3. Size: 18 by 36 inches (457 by 915 mm).

## I. Double Coat Hook:

1. Basis-of-Design Product: B-672.
2. Mounting: Concealed with steel set screw.
3. Material and Finish: Bright polished stainless steel.

## J. Specimen Pass Box:

1. Basis-of-Design Product: A&J Washroom (AJW) Model U905.
2. Description: 18 ga. Stainless steel body with self-closing doors, push-pulls, heavy-duty continuous stainless steel piano hinges, and removable spillage tray.
3. Mounting: Recessed.
4. Size: 14" x 14" x up to 8" deep (adjustable for deep walls).
5. Finish: Stainless steel with No. 4 satin finish.

## H. Diaper-Changing Station:

1. Basis-of-Design Product: Bradley Model 961.
2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
  - a. Engineered to support a minimum of 113-kg (250-lb) static load when opened.
3. Mounting: Surface mounted, with unit projecting not more than 100 mm (4 inches) from wall when closed.
4. Operation: By pneumatic shock-absorbing mechanism.
5. Material and Finish: Gray.
6. Liner Dispenser: Built in.

**2.3 UNDERLAVATORY GUARDS**

## A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Plumberex Specialty Products, Inc.
2. Truebro by IPS Corporation.

## B. Underlavatory Guard:

1. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping; allow service access without removing coverings.
2. Material and Finish: Antimicrobial, molded plastic, white.

## 2.4 CUSTODIAL ACCESSORIES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products by Bobrick Washroom Equipment, Inc. indicated below or comparable products by one of the following:
1. A & J Washroom Accessories, Inc.
  2. American Specialties, Inc.
  3. Bradley Corporation.
  4. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
  5. Tubular Specialties Manufacturing, Inc.
- B. Mop and Broom Holder:
1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-239.
  2. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
  3. Length: 914 mm (36 inches).
  4. Hooks: Four.
  5. Mop/Broom Holders: Three, spring-loaded, rubber hat, cam type.
  6. Material and Finish: Stainless steel, No. 4 finish (satin).
    - a. Shelf: Not less than nominal 1.3-mm- (0.05-inch-) thick stainless steel.
    - b. Rod: Approximately 6-mm- (1/4-inch-) diameter stainless steel.

## 2.5 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 1112 N (250 lbf), when tested according to ASTM F 446.

### 3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.

- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

**END OF SECTION 10 28 00**

## SECTION 10 44 13 - FIRE PROTECTION CABINETS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Fire-protection cabinets for portable fire extinguishers.
- B. Related Requirements:
  - 1. Section 06 10 00 "Rough Carpentry" for concealed wood blocking.
  - 2. Section 10 44 16 "Fire Extinguishers."

#### 1.3 PREINSTALLATION CONFERENCE

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review methods and procedures related to fire-protection cabinets including, but not limited to, the following:
    - a. Schedules and coordination requirements.
    - b. Cabinet locations, clearances, and mounting heights, prior to closing walls.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semirecessed-, or surface-mounting method and relationships of box and trim to surrounding construction.
- B. Product Schedule: For fire-protection cabinets. Indicate whether recessed, semirecessed, or surface mounted. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

#### 1.6 COORDINATION

- A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

- B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

## PART 2 - PRODUCTS

### 2.1 FIRE-PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Guardian Fire Equipment, Inc.
    - b. Larsens Manufacturing Company.
    - c. Potter Roemer LLC.
- B. Cabinet Construction: Nonrated.
- C. Cabinet Material: Aluminum sheet.
  - 1. Shelf: Same metal and finish as cabinet.
- D. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
  - 1. Rolled-Edge Trim: 64-mm (2-1/2-inch) backbend depth.
- E. Cabinet Trim Material: Aluminum sheet.
- F. Door Material: Aluminum sheet.
- G. Door Style: Vertical duo panel with frame.
- H. Door Glazing: Tempered float glass (clear).
- I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
  - 1. Provide projecting lever handle with cam-action latch.
  - 2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.
- J. Accessories:
  - 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
  - 2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.
    - a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
      - 1) Location: Applied to cabinet glazing.
      - 2) Application Process: Silk-screened.
      - 3) Lettering Color: Red.
      - 4) Orientation: Vertical.

**K. Materials:**

1. Aluminum: ASTM B 221M (ASTM B 221), with strength and durability characteristics of not less than Alloy 6063-T5 for aluminum sheet. ASTM B 221M (ASTM B 221) for extruded shapes.
  - a. Finish: Clear anodic.
2. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

**2.2 FABRICATION**

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
  1. Weld joints and grind smooth.
  2. Provide factory-drilled mounting holes.
  3. Prepare doors and frames to receive locks.
  4. Install door locks at factory.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
  1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 13 mm (1/2 inch) thick.
  2. Fabricate door frames of one-piece construction with edges flanged.
  3. Miter and weld perimeter door frames.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

**2.3 GENERAL FINISH REQUIREMENTS**

- A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

- A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

### 3.3 INSTALLATION

- A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights indicated below:
  - 1. Fire-Protection Cabinets: 1372 mm (54 inches) above finished floor to top of cabinet.
- B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
  - 1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semirecessed fire-protection cabinets.
  - 2. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

### 3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.
- E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

**END OF SECTION 10 44 13**

## SECTION 10 44 16 - FIRE EXTINGUISHERS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers.
- B. Related Requirements:
  - 1. Section 10 44 13 "Fire Protection Cabinets."

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher.
- B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

#### 1.6 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

#### 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure of hydrostatic test according to NFPA 10.
    - b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

## **PART 2 - PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
  1. Provide fire extinguishers approved, listed, and labeled by FM Global.

### **2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS**

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet indicated.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Guardian Fire Equipment, Inc.
    - b. Larsens Manufacturing Company.
    - c. Potter Roemer LLC.
  2. Valves: Manufacturer's standard with metal valve.
  3. Handles and Levers: Manufacturer's standard.
  4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.
- B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 2-A:10-B:C, 2.3-kg (5-lb) nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine fire extinguishers for proper charging and tagging.
  1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION**

- A. General: Install fire extinguishers in locations indicated and in compliance with requirements of authorities having jurisdiction.

**END OF SECTION 10 44 16**

## SECTION 10 73 26 - WALKWAY COVERINGS

### PART 1 - GENERAL

#### 1.01 SUMMARY

A. Section Includes: Design, fabrication, and installation of welded extruded aluminum walkway cover systems.

1. Canopies on building as indicated on drawings.

B. Related Sections

1. Section 07 62 00 "Sheet Metal Flashing and Trim."

#### 1.02 REFERENCES

A. The Aluminum Association (AA):

1. The Aluminum Design Manual 2000, Specifications & Guidelines for Aluminum Structures.

B. American Architectural Manufacturers Association (AAMA):

1. AAMA 2604, Voluntary Specification, Performance Requirements and Test Procedures for High Performing Organic Coatings on Aluminum Extrusions and Panels.
2. AAMA 2605, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

C. American Society of Civil Engineers (ASCE):

1. ASCE 7, Minimum Design Loads for Buildings and Other Structures.

D. American Society for Testing and Materials (ASTM):

1. ASTM B 209, Specification for Aluminum and Aluminum- Alloy Sheet and Plate.
2. ASTM B 221, Specification for Aluminum and Aluminum- Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
3. ASTM C 150, Specification for Portland Cement.

E. American Welding Society (AWS):

1. ANSI/AWS D1.2, Structural Welding Code - Aluminum.

#### 1.03 SYSTEM DESCRIPTION

A. Delegated Design Requirements:

1. Design Walkways and Canopies in accordance with The Aluminum Design Manual 2000.
2. Comply with the wind requirements of ASCE 7.
  - a. Wind Speed: See structural.
  - b. Importance Factor: 1.15.
  - c. Exposure Category: C.
  - d. Deflection Limits: For wind loads, no greater than 1/180 of the span.

3. Provide an all welded extruded aluminum system consisting of columns, beams, deck and trim, complete with internal drainage. Non-welded systems are not acceptable.
4. Provide expansion joints to accommodate temperature changes of 120 degrees F. Provide expansion joints with no metal to metal contact.
5. Canopy shall be self-draining from deck through bents to discharge point at ground level unless otherwise indicated.

B. Performance Requirements:

1. Grout: Compressive strength of 2000 psi, minimum.

#### 1.04 SUBMITTALS

A. Product Data: Manufacturer's product information, specifications, and installation instructions for walkway cover components and accessories.

B. Shop Drawings: Include plan dimensions, elevations, and details.

C. Samples:

1. Selection: Manufacturer's full range of colors for the finishes selected.
2. Verification: 3-inch-square samples of each finish selected on the substrate specified.

D. Delegated Design Data: Design calculations bearing the seal of a Registered Professional Engineer, licensed in the State of Louisiana. Design calculations shall state that the canopies and walkway cover system design complies with the wind requirements of ASCE 7, the stability criteria of applicable building code, and all other governing criteria.

1. Provide reactions required for footing design by the construction documents.

#### 1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: At least ten years experience in the design, fabrication, and erection of extruded aluminum walkway cover systems.

#### 1.06 WARRANTY

A. Warranty Period: One year from date of substantial Completion.

B. Finish Warranty Period: 20 years for date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS

A. Furnish products fabricated by one of the following:

1. Dittmer Architectural Aluminum.
2. E.L. Burns Company.
3. Peachtree Protective Covers, Inc.,
4. Perfection Architectural Systems, Inc.
5. Tennessee Valley Metals, Inc.

#### 2.02 MATERIALS

- A. Aluminum Members: Extruded aluminum, ASTM B 221, 6063 alloy, T6 temper.
- B. Fasteners: Aluminum, 18-8 stainless steel, or 300 series stainless steel.
- C. Protective Coating for Aluminum Columns Embedded in Concrete: Clear acrylic.
- D. Grout: Non-shrink type.
- E. Gaskets: Dry seal santoprene pressure type.
- F. Aluminum Flashing: ASTM B 209, Type 3003 H14, 0.040 inch, minimum.

### 2.03 MIXES

- A. Grout: 1 part portland cement to 3 parts sand, add water to produce a pouring consistency.

### 2.04 FABRICATION

- A. General:
  - 1. Shop Assembly: Assemble components in shop to greatest extent possible to minimize field assembly.
  - 2. Welding: In accordance with ANSI/AWS D1.2.
  - 3. Bent Construction: Factory weld beams to columns with neatly mitered corners to form one-piece rigid bents. Make welds smooth and uniform using an inert gas shielded arc. Perform suitable edge preparation to assure 100% penetration. Grind welds only where interfering with adjoining structure to allow for flush connection. Field welding is not permitted. Rigid mechanical joints may be used only if fully welded bents cannot be shipped on local, state, or federal highways without a special permit from the department of transportation.
  - 4. Deck Construction: Fabricate from extruded modules that interlock in a self-flashing manner. Positively fasten interlocking joints at 8 inches on center creating a monolithic structural unit capable of developing the full strength of the sections. The fastenings must have minimum shear strength of 350 pounds each. Assemble deck with sufficient camber to offset dead load deflection.
  - 5. Canopy Tension Supports: To match existing canopies across Carrollton Avenue. Tie into building structure.
- B. Columns: Provide radius-cornered tubular extrusions with cutout and internal diverter for drainage where indicated. Circular downspout opening in column not acceptable.
- C. Beams: Provide open-top tubular extrusion, top edges thickened for strength and designed to receive deck members in self-flashing manner. Provide structural ties in tops of all beams.
- D. Deck: Extruded self-flashing sections interlocking into a composite unit. Provide welded plate closures at deck ends.
- E. Fascia for Canopies: Match existing at loading dock on building. Provide fascia splices where continuous runs of fascia are jointed. Locate splices to be in line with bents and fasten in place on hidden or non-vertical surfaces.
- H. Factory Finishing: Finish designations prefixed by AA comply with system established by the AAMA for designating aluminum finishes.
  - 1. High performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

- a. Fluoropolymer Two-Coat Coating System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2604.
- b. Colors: As selected by Architect from manufacturer's full range.

## 2.05 ACCESSORIES

- A. Provide aluminum beams in deck flutes to support chilled water piping and mechanical units where occurring. Refer to mechanical drawings.
- B. Fasteners
  1. Deck Screws: No. 14 by 1 inch (25 mm), self-tapping, Type 18-8 stainless steel with neoprene washers.
  2. Trim Screws: No. 10 by 1/2 inch (13 mm), self-tapping, Type 18-8 stainless steel.
  3. Trim Rivets: Aluminum, size recommended by manufacturer for specific condition.
  4. Other Fasteners: Type 18-8 stainless steel, type recommended by manufacturer for specific condition.

## 2.06 FABRICATION

- A. Shop Assembly: Fabricate cross beams and columns into one-piece rigid bents with corners mitered and heli-arc welded to the extent that completed bents can be shipped on local, state, and federal highways without special permit. Provide bolted connections for bents required to be shipped unassembled.
- B. Shop Assembly: Fabricate cross beams and columns for field assembled bolted connections.
- C. Canopy Field Assembly: Fabricate and assemble with minimal joints. Tie into building structure.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Verification of Conditions: Verify that all concrete, masonry, and roofing work in the vicinity is complete and suitable for attachment and erection of canopy.

### 3.02 ERECTION

- A. Erect protective cover true to line, level, and plumb and in accordance with canopy manufacturer's instructions. Protect aluminum columns embedded in concrete with clear acrylic. Fill downspout columns with grout to the discharge level to prevent standing water. Install weep holes at top of concrete in non-draining columns to remove condensation.
- B. Provide hairline miters and fitted joints on all canopy and walkway cover joints.

### 3.03 CLEANING

- A. Clean all protective cover components promptly after installation.

### 3.04 PROTECTION

- A. Protect materials during and after installation.

END OF SECTION 10 73 26

## SECTION 11 31 00 - RESIDENTIAL APPLIANCES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Appliances supplied by the Owner and installed by the Contractor.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, dimensions, furnished accessories, and finishes for each appliance.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of appliance, from manufacturer.
- B. Warranties: Sample of special warranties.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each residential appliance to include in operation and maintenance manuals.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain residential appliances from single source.
- C. Regulatory Requirements: Comply with the following:
  - 1. NFPA: Provide electrical appliances listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  - 2. ANSI: Provide gas-burning appliances that comply with ANSI Z21 Series standards.
- D. Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

**1.7 WARRANTY**

- A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Two years from date of Substantial Completion.

**PART 2 - PRODUCTS****2.1 MICROWAVE OVENS**

- A. Provided by Owner, installed by Contractor.
1. Verify electrical requirements with Owner. See drawings for location and mounting.

**2.2 REFRIGERATOR/FREEZERS**

- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Amana; a division of Whirlpool Corporation.
  2. BOSCH Home Appliances.
  3. General Electric Company (GE).
  4. Maytag; a division of Whirlpool Corporation.
  5. Whirlpool Corporation.
- C. Refrigerator/Freezer: Two-door refrigerator/freezer with freezer on top and complying with AHAM HRF-1.
1. Type: Freestanding, as indicated on drawings.
  2. Dimensions:
    - a. Width: 36 inches (914 mm).
  3. Storage Capacity:
    - a. Refrigeration Compartment Volume: 15.6 cu. ft. (0.44 cu. m).
    - b. Freezer Volume: 5.13 cu. ft. (0.15 cu. m).
    - c. Shelf Area: Three adjustable glass shelves.
  4. General Features:
    - a. Door Configuration: Overlay.
    - b. Dispenser in door for ice and cold water.
    - c. Built-in water filtration system.
    - d. Separate temperature controls for each compartment.
  5. Refrigerator Features:
    - a. Interior light in refrigeration compartment.
    - b. Compartment Storage: Vegetable crisper and meat compartment.
    - c. Door Storage: Modular compartments Gallon (3.8 L-) milk-container storage.
    - d. Temperature-controlled meat/deli bin.

6. Freezer Features: One freezer compartment with door swung as indicated on drawings.
  - a. Automatic defrost.
  - b. Interior light in freezer compartment.
  - c. Automatic icemaker and storage bin.

7. Appliance Color/Finish: Black.

D. Lab Refrigerator: See drawings for size and location.

1. Separate electrical circuit.

## 2.2 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, power connections, and other conditions affecting installation and performance of residential appliances.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before appliance installation.
- C. Examine walls, ceilings, and roofs for suitable conditions where microwave ovens with vented exhaust fans will be installed.
- D. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION, GENERAL

- A. General: Comply with manufacturer's written instructions.
- B. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and that rough openings are completely concealed.
- C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.
- D. Utilities: Comply with plumbing and electrical requirements.

### 3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
  - 1. Perform visual, mechanical, and electrical inspection and testing for each appliance according to manufacturers' written recommendations. Certify compliance with each manufacturer's appliance-performance parameters.
  - 2. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.
  - 3. Operational Test: After installation, start units to confirm proper operation.
  - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.
- C. An appliance will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION 11 31 00

## SECTION 12 41 00 – OFFICE ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Acrylic pocket chart holders.
  - 2. Medical trash cans.
  - 3. Biohazard trash cans.
  - 4. Office trash cans.
- B. Related Requirements:
  - 1. Section 06 10 00 "Rough Carpentry" for concealed blocking for wall-mounted units.

#### 1.3 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Confirm installation of concealed blocking in walls prior to enclosure of walls.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include cut sheets, material descriptions, dimensions of individual components and profiles, and finishes.
  - 2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
  - 1. Identify locations using room designations indicated.
  - 2. Identify accessories using designations indicated.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranty.

## 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

## 1.7 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, cracking, broken welds, and mechanical failure.
  - 2. Warranty Period: One (1) year from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 ACRYLIC POCKET CHART HOLDERS

- A. Basis of Design Product: Northern Acrylics Model No. 1300-1575.
  - 1. Dimensions: 15.75" high x 13" wide x 4.5" deep.
  - 2. Material: ¼" thick clear acrylic. Machine radius and polished edges.
  - 3. Attachment: Surface mounted with exposed stainless steel screws.

### 2.2 MEDICAL TRASH CANS

- A. Basis of Design Product: Grainger Model No. 6ZCLO (Tough Guy).
  - 1. Dimensions: 10" diameter x 17" high.
  - 2. Capacity: 2.5 gallons.
  - 3. Material and Finish: Stainless steel, satin finish.
  - 4. Description: Anti-fingerprint, step-on foot pedal to open lid. Built-in bag holder.

### 2.3 BIOHAZARD TRASH CANS

- A. Basis of Design Product: Grainger Model No. 2KDU9 (Rubbermaid).
  - 1. Dimensions: 12" diameter x 23" high.
  - 2. Capacity: 12 gallons.
  - 3. Material and Finish: Powder-coat steel, red finish.
  - 4. Description: Step-on foot pedal to open lid.

### 2.4 OFFICE TRASH CANS

- A. Basis of Design Product: Grainger Model No. D2118 (Tough Guy).
  - 1. Dimensions: 14.5" x 10.5" x 15" high.
  - 2. Capacity: 7 gallons.
  - 3. Material: Fire-safe fiberglass.
  - 4. Color: As selected by Architect from available standard colors.

## 2.5 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.8-mm (0.031-inch) minimum nominal thickness unless otherwise indicated.
- B. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.9-mm (0.036-inch) minimum nominal thickness.
- C. Galvanized-Steel Sheet: ASTM A 653/A 653M, with Z180 (G60) hot-dip zinc coating.
- D. Fasteners: Screws, bolts, and other devices of stainless steel and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- E. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

## 2.6 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

### 3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 12 41 00



## SECTION 22 00 00 – PLUMBING

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions, and other Sections of Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This section includes all material, methods, and accessories for the above ground plumbing systems, including: fixtures, floor drains, roof drains, receptors, stops, p-traps, water heaters, faucets and fittings. Administrative requirements include permits and inspections, warranties, and code compliance documentation.

#### 1.3 COORDINATION WITH PLANS AND SPECIFICATIONS

- A. Coordinate requirements for accessories, p-traps, offsets, stops, escutcheons, valves, fittings, and rough in requirements with the fixture schedule located in the drawings and other work described in Division 23.

#### 1.4 GENERAL REQUIREMENTS

- A. Fixtures, specialties, and accessories shall comply with applicable standards and codes, including the local authority having jurisdiction.
- B. ADA-compliant faucets and fixtures shall meet the complete requirements for the Americans with Disabilities Act.
- C. All piping shall be insulated, or under-lavatory protection system be put in place for all lavatories identified as ADA-compliant or handicapped accessible.

### PART 2 – PRODUCTS

#### 2.1 MANUFACTURERS

- A. Fixtures
  - 1. Kohler
  - 2. American Standard
  - 3. Gerber
  - 4. Elkay
- B. Hose Bibbs, Flush Valves, Supports, Stops, Cleanouts, Specialties, Accessories
  - 1. Josam
  - 2. Zurn

3. Sloan
4. BrassCraft
5. NIBCO
6. Jay R. Smith
7. TrueBro

## 2.2 SUPPORTS AND CARRIERS

- A. All wall mounted fixtures shall be supported from the floor using adjustable floor-mounted fixture supports. Wall hangers are not acceptable.
- B. Closely coordinate fixture support requirements with rough-in of waste and vent piping. Submit shop drawings to Architect for approval prior to commencement of work.

## PART 3 – EXECUTION

### 3.1 FIXTURE INSTALLATION

- A. Assemble fixtures, carriers, trim, and accessories in accordance with the manufacturer's written instructions,
- B. Install fixtures level and plumb.
- C. Install water supply piping with stop on each supply to each fixture being connected. Attach supplies to building substrate within pipe spaces behind fixtures. Install stops (with accessory escutcheons) in location easily accessible.
- D. Furnish and install p-traps for fixtures which require them. Provide offset tailpieces on ADA-compliant fixtures. P-traps and exposed waste piping shall be chrome plated brass with adjustable lock-nut assemblies. Omit traps on fixtures with integral traps.
- E. Install flushometer valves for ADA-compliant fixtures with handle mounted on wide side of the compartment.
- F. Provide open front seats without covers on all water closets.
- G. Provide no-lead construction of all faucets and fittings, in compliance with the Clean Water Act.
- H. Set floor drains in new building construction. Coordinate location, sloping, flashing, and other installation requirements with work of other trades.
- I. Seal joints between fixtures and walls, floors, counters, or other building elements. Match sealant color to that of fixture.
- J. Make required water, waste, and vent connection from main systems to individual fixtures.

### 3.2 CLEANING, ADJUSTMENT, AND FINAL ACCEPTANCE

- A. Flush all supply piping systems with faucet strainers removed until water runs clear. Replace faucet strainers and tighten.

- B. Test all flush valve fixtures to ensure adequate water delivery and positive shut-off after flushing cycle. Adjust valves as required to perform satisfactorily.
- C. Thoroughly clean fixtures, faucets, valves, trim, and accessories prior to project closeout. Remove debris from strainers and reinstall.
- D. Tighten all compression connections in water supplies. Replace defective compression fittings showing evidence of leaking, rust, or other malfunctioning.

END OF SECTION



## SECTION 23 05 00 – BASIC MECHANICAL REQUIREMENTS

### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions, and other Sections of Division 1 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. This section includes general administrative criteria for execution of the work of Divisions 22 and 23, including Contractor's Qualifications, Quality Assurance, Codes and Standards, Permits and Inspections, Equipment and Materials, Storage and Handling, Submittals, Site Conditions, Warranties, Shop Drawings, Record Documents, Painting, Rough In of Mechanical Installations, and Coordination with Other Trades.

### 1.3 CONTRACTOR'S QUALIFICATIONS

- A. Acceptable contractors qualified for the work described herein shall have the personal experience, training, and certifications to execute the work as described by the Project Plans and Specifications. Contractor's Representative shall be capable of providing evidence of successful completion of no less than three projects of comparable size and complexity, and the Project Foreman shall be subject to approval prior to the commencement of work.
- B. Work accomplished under this Division shall be done in accordance with the laws and statutes of the local authorities having jurisdiction, and the Contractor shall be licensed under the laws and regulations of those same authorities.

### 1.4 QUALITY ASSURANCE

- A. Manufacturer names and model numbers are provided in the Project Documents in an effort to establish a minimum standard of quality and performance for the item listed. Substitutions are allowed only if the alternate equipment or material meet or exceed all aspects of the project specifications and performance criteria and can be physically located and installed in such a manner as to not affect the intended layout, maintenance, and/or service clearances for other equipment items. The Contractor shall be responsible for assuring and guaranteeing that any equipment or material substitutes will perform satisfactorily for the service for which they are intended. When two or more names or model numbers are provided, any of the listed items are acceptable.
- B. The intent of these documents is to provide complete, integrated, and functioning systems. To this end, proper coordination is required to assure compatibility between products and equipment. Any compatibility issues shall be brought to the attention of the Architect immediately.
- C. All computer software and hardware shall be "Y2K-COMPLIANT".
- D. All motors and electrical items furnished loose or with equipment of Division 15 shall comply with all required testing agencies (UL, FM, etc.) and the most recent edition of NFPA 70.

## 1.5 CODES AND STANDARDS

- A. The work described in these Project Documents shall comply with the requirements of the local authorities having jurisdiction, as well as the following standards and codes:
1. ASHRAE 90.1 ("Energy Code")
  2. ASHRAE 62 ("Ventilation Code")
  3. NFPA 90A ("Mechanical Installation Code")
  4. ASHRAE 15 ("Mechanical Refrigeration Safety Code")
  5. IMC International Mechanical Code
  6. LA Plumbing Code
  7. IGC International Gas Code
  8. NFPA 101 ("Life Safety Code")
  9. NFPA 70 ("National Electric Code")
  10. ARI Ratings
  11. ASME Pressure Vessel Certifications

## 1.6 PERMITS, FEES, AND INSPECTIONS

- A. Contractor shall arrange for and pay for all required inspections during the construction process, and shall closely coordinate with the work of other disciplines prior to receiving inspections and certifications. No additional compensation will be provided for uncovering or exposing work after the fact for inspection or certification.
- B. Contractor shall furnish original copies of all certifications and inspection reports to the Owner at Project Closeout.

## 1.7 EQUIPMENT AND MATERIALS

- A. Each piece of equipment shall bear a nameplate indicating the manufacturer's name, product model number, serial number, listings and approvals (UL, ASME, etc.), and capacities. If possible, indicate on the nameplate stamp the Equipment Tag number or designation as listed in the Project Documents. If not possible, provide additional signage indicating such information and affix directly to the unit or item in a location accessible and in plain view.
- B. Each item of equipment shall be the standard product of a manufacturer regularly engaged in the design, fabrication, production, and certification of that particular type of equipment. This shall in no way prevent custom equipment manufacturers from providing equipment specifically designed for the service and capacity described in the Project Documents.

## 1.8 STORAGE AND HANDLING

- A. Equipment and materials shall be delivered to the site in original packaging / containers, and shall be stored off of the ground in an area sheltered from the elements and damage from construction operations, and shall be readily available for access and inspection. Items susceptible to damage from moisture or temperature extremes shall be stored in a climate controlled location on or off of the site prior to installation.
- C. Any equipment damaged during shipping, storage, or handling shall not be accepted.

## 1.9 SUBMITTALS

- A. Submit to the architect submittals (including material samples and color charts, where required) in accordance with Division 01 Section 01300.
- B. Minimum number of copies for mechanical submittals shall be five.
- C. Each submittal shall be clearly marked with the specification and/or drawing number where the equipment is described or shown.
- D. Each submittal shall bear the review stamp of the Contractor responsible for the work. Submittals not reviewed and approved by the Contractor will be returned without review or approval.
- E. Review of each submittal is for general compliance with the design intent, and does not relieve the Contractor of his responsibility for compliance with the specific requirements of the Project Documents. Review by the Architect / Engineer does not certify or ensure proper capacities, quantities, or methods of installation. It shall remain the responsibility of the Contractor to properly coordinate the equipment, material, methods of installation, and compatibility of selected products prior to procurement and installation.
- F. Shop Drawings: Shop drawings shall be submitted to the Architect as soon as possible for review and approval. Shop drawings shall consist of drawings at no smaller than  $\frac{1}{4}'' = 1'-0''$  scale, and shall include all items and equipment, including required clearances, access panels, safeties, dimensions, weights, and capacities. Shop drawings shall indicate through dimensioned plans, elevations, sections, and details the intended methods of installation, as well as the work of other trades that impact the work of Division 15. Shop drawings are required for all mechanical rooms, field-fabricated hangers and supports, housekeeping pads, vibration isolation assemblies, controls and equipment interlock, and piping systems.

## 1.10 SITE CONDITIONS

- A. The Contractor shall be responsible for acquainting himself with the site, including the difficulties and restrictions in executing the work described in the Project Documents.
- B. Special attention must be given to site access, equipment storage, coordination of shipping and delivery with work of other trades, above and below ground utilities, existing landscaping, existing architectural items of historical significance, and construction phasing requirements due to obstructions, noise constraints, site access scheduling, etc.
- C. Failure to be informed of existing site conditions does not relieve the Contractor of his responsibilities, and therefore no additional compensation will be provided. Unforeseen / unknown conditions as described in Division 01 Sections shall be handled in accordance with those sections.

## 1.11 WARRANTIES

- A. The Contractor shall warranty his work for a period as specified in Division 01.
- B. Manufacturers' warranties shall be assigned to the Owner at project closeout, or upon beneficial by the Owner. Equipment startup and operation to facilitate construction does not constitute beneficial

use by the Owner, therefore the warranty period on such equipment will not begin until such time as the Owner uses the equipment for occupying or operating the building.

- C. Extended warranties and service agreements as described in other Division 15 sections shall be in accordance with the General Conditions of the contract and the associated Division 01 specification sections.

#### 1.12 RECORD DOCUMENTS

- A. The Contractor shall maintain a "red-line" set of documents at the job site at all times. This drawing set shall show all substitutions and modifications to the drawings as required by product changes, unforeseen conditions, or other changes, and shall include all RFI responses or official sketches issued during the construction process.
- B. Changes to the documents should include a notation indicating the date and the directive responsible for the change (e.g., Change dated 12-12-2000 per RFI #1234, Sketch M1-SK-1)
- C. At the completion of the project, the drawings must be compiled and redrawn, indicating all changes to the original Project Documents. If requested, electronic files may be procured from the Architect or Engineer in accordance with their policy in effect at the time of the request.

#### 1.13 PAINTING

- A. All painting shall be done in accordance with Division 09, except for touch-up of factory finishes.
- B. Touch-up of factory finishes shall be done by an experienced painter with approved products provided by, or on behalf of, the original equipment manufacturer.

### PART 2 – PRODUCTS

Not used.

### PART 3 – EXECUTION

#### 3.1 MECHANICAL ROUGH-IN

- A. The Project Documents are diagrammatic in nature, and are intended to provide a general layout for the items, materials, equipment, and systems utilized in the project. Therefore, rough-in requirements, dimensions, quantities, and methods of installation reside with the Contractor.
- B. Rough-in of mechanical items shall be done in close accordance with the equipment's requirements, as well as local codes and authorities. Inspections of rough-in work shall be made prior to covering.

#### 3.2 COORDINATION WITH OTHER TRADES

- A. The Contractor shall closely coordinate his work with the work of other trades. Sequencing and scheduling of equipment delivery, storage, handling, and installation shall be the responsibility of the Contractor.

- B. Where conflicts arise between the intent of the Project Documents and the requirements of equipment installation, notify the architect immediately and provide a proposed solution.
- C. Where changes are required, indicate such changes on the "red-line" set of documents, and clearly indicate the new installation on the Record Documents.
- D. Install mechanical items with appropriate space for service, maintenance, inspection, and access, and indicate items of other trades on the Record Documents that may impact equipment location and access.
- E. Failure to coordinate with work of other trades shall preclude the Contractor from receiving additional compensation for uncovering or demolishing untimely work in order to facilitate installation of mechanical items.

END OF SECTION



## 23 05 01 – BASIC MECHANICAL MATERIALS AND METHODS

### PART 1 – GENERAL

#### 1.1 SUMMARY

- A. This section includes work generally pertaining to several Division 22 and 23 sections. Such work outlined in this section includes: accessories, hangers and supports, valve and equipment identification, access panels, escutcheons, sleeves, flashing, pressure / temperature / flow measurement, testing and approvals, equipment setting / alignment / adjustment, equipment and system start-up, cutting and patching, and coordination with other trades.

#### 1.2 RELATED SECTIONS

- A. The General Provisions of the Contract, including General and Supplementary Conditions, and various Sections of Divisions 22 and 23.

#### 1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical rooms, pipe chases, furred areas, shafts, plenums, crawl spaces, and tunnels.
- B. Exposed Interior Installations: Spaces exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Concealed Interior Installations: Spaces concealed from view or contact by building occupants. Examples include installations in shafts and plenums.
- D. Exposed Exterior Installations: Exposed to view outdoors, and/or in contact with exterior ambient conditions and elements. Example includes rooftop installations.
- E. Concealed Exterior Installations: Concealed from view and protected from ambient outdoor conditions and contact from building occupants, but subject to outdoor temperatures and humidity. Examples include equipment installations in unheated shelters.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipe and tubing with factory-applied end caps. Maintain caps during delivery, handling, and storage to prevent pipe damage and fouling of piping.
- B. Deliver valves and fittings with end caps, and protect from dirt and moisture during handling and storage. Store electronic and pneumatic actuators in a climate controlled area to prevent fouling.
- C. Store plastic piping protected from direct sunlight and extraneous heat sources. Do not store piping on roof. Protect piping from damage, including thermal stresses and damages arising from construction practices.

#### 1.5 SEQUENCING AND SCHEDULING

- A. Arrange for slots, openings, sleeves, chases, and access for installation of mechanical components. Coordinate with structural components for sleeve locations and submit to Architect for approval.
- B. Do not notch, cut, or alter building structural components without prior approval from the Architect.
- C. Coordinate with work of other trades to integrate mechanical components in the normal sequence of construction.
- D. Coordinate installation of identifying devices and labels relative to painting operations and insulation installation. Tags, labels, and nameplates shall be affixed after such installation and practices are complete.

## PART 2 – PRODUCTS

### 2.1 MANUFACTURERS

- A. Dielectric Flanges
  - 1. Watt Industries, Inc.
  - 2. Central Plastics Co.
- B. Dielectric Flange Insulating Kits
  - 1. Calpico, Inc.
  - 2. Central Plastics Co.
- C. Dielectric Nipples
  - 1. Lochinvar Corp.
  - 2. Calpico, Inc.
- D. Mechanical Sleeve Seals
  - 1. Thunderline / Link-Seal
  - 2. Metraflex Co.
- E. Manufactured Sleeves
  - 1. Pipe Shields
  - 2. Proset
- F. Motors
  - 1. Baldor
  - 2. G.E.
  - 3. Lewis-Allis
  - 4. Marathon
  - 5. Westinghouse
  - 6. Or equal

- G. Sealants
  - 1. Dow-Corning
  - 2. Tremco
  - 3. 3M
- H. Access Doors
  - 1. The Williams Bros. Corp.
  - 2. Miller Ltd. Partnership
  - 3. Milcor, Inc.
  - 4. Or equal
- I. Firestopping
  - 1. 3M
  - 2. Dow-Corning
- J. Manufactured Pipe Hangers
  - 1. Grinnell
  - 2. Or equal
- K. Channel Support Systems
  - 1. Unistrut
  - 2. Grinnell
- L. Hanger Shield Inserts
  - 1. Pipe Shields, Inc.
  - 2. Grinnell
- 2.2 PIPE AND PIPE FITTINGS
  - A. <See Division 15100 for pipe and pipe fitting information>
- 2.3 JOINING MATERIALS
  - A. Refer to individual sections for joining methods not listed below.
  - B. Pipe-Flange Gasket Materials: Suitable for thermal and chemical conditions of the application. Materials shall be asbestos free, and shall comply with the requirements of ASME and AWWA for the service intended.
- 2.5 DIELECTRIC FITTINGS
  - A. Item shall be assembly or fitting with insulating material to positively isolate joined dissimilar metals.

- B. Items shall be of quality construction, suited for the temperature and corrosive nature of the fluid conveyed.
  - C. Connections between steel and copper piping may be made with a minimum 12" brass nipple for pipe sizes 4" and less, and 18" for pipe sizes larger than 4".
- 2.6 MECHANICAL SLEEVE SEALS
- A. Items shall be of modular design, with interlocking rubber links shaped to continuously fill the annular space between the pipe and sleeve. Include with the assembly required bolts and pressure plates.
- 2.7 PIPING SPECIALTIES
- A. Sleeves (for Wall, Floor, Slab, and Roof Penetrations):
    - 1. Steel sheet metal (0.0239" min thickness), galvanized, longitudinal joint, round tube
    - 2. Steel Pipe: Schedule 40 galvanized steel with plain ends.
    - 3. Cast Iron: Ductile Iron pressure pipe with plain ends and integral waterstop.
  - B. Escutcheons (Manufactured wall, ceiling, and floor plates)
    - 1. ID – Closely fit around piping
    - 2. OD – Completely cover opening
    - 3. Cast Brass – One piece with set screw or split cast with set screw
    - 4. Stamped Steel – One piece or split plate, spring loaded or furnished with set screw.
- 2.8 ELECTRICAL COMPONENTS
- A. All electrical items furnished with mechanical equipment shall comply with NFPA 70, and shall be listed for such service.
  - B. Comply with requirements of NFPA 70, NEMA, UL, and FM where applicable.
  - C. Coordinate electrical characteristics of motors closely with available power and phase. Verify proper direction of motors during equipment start-up.
  - D. Reference Section 15800 for Variable Frequency Drive specifications.
- 2.9 PIPE HANGERS AND SUPPORTS
- A. Provide galvanized metallic coatings on all hangers where field applied finish is not required.
  - B. Provide non-metallic coatings on hangers where hanger or support comes in contact with copper tubing or pipe.
  - C. Shields must extend around a minimum of the lower 180° of the pipe (clamped hangers and supports require 360° coverage on all shields).

## PART 3 – EXECUTION

### 3.1 GENERAL

- A. All equipment, material, items, and accessories shall be installed in accordance with all applicable codes and standards, as well as the manufacturer's written installation instructions and other conditions of each product's listing.

### 3.2 POWER, CONTROLS AND SAFETIES

- A. Closely coordinate power requirements with Electrical Contractor. Ensure proper voltage and phase is provided, and adequate safeties are in place and operational prior to equipment start-up.
- B. Control wiring (low voltage is less than 115 volts) may be run by the Mechanical Contractor. Coordinate requirements for access, conduit, cable trays, openings in floors, walls, and ceiling, and power transformer requirements with work of other trades.
- C. Coordinate closely with Fire Alarm Contractor for safeties and interlocks. Provide necessary coordination information during the submittal process to ensure adequate capacity, space, addresses, etc. are provided for each safety item.
- D. Reference Section 15950 for additional Controls requirements.

### 3.3 CUTTING AND PATCHING

- A. Cutting and patching work shall be done by tradesmen with experience in selective demolition and repair. Coordinate closely with architectural requirements and plans prior to opening and patching existing or new building components.
- B. Painting shall be done in accordance with Division 09.

### 3.4 INSTALLATION OF PIPE HANGERS AND SUPPORTS

- A. Pipe hangers for insulated piping with vapor barrier jackets shall be installed with a metal insulation support shield to prevent crushing of insulation.
- B. Provide rigid insulation and shield on piping over 3" wherever piping is supported by hanger. Extend rigid insulation a minimum of 3" beyond the limits of the hanger.

END OF SECTION



## SECTION 23 05 93 – TESTING, ADJUSTING, AND BALANCING

### PART 1 – GENERAL

#### 1.1 RELATED SECTIONS

- A. The General Provisions of the Contract, including General and Supplementary Conditions, and various Sections of Division 23.

#### 1.2 SUMMARY

- A. This section includes procedural and administrative requirements for the testing, adjustment, and balancing of the Division 23 systems. TAB requirements include: airflow measurement and adjustment, static pressure maintenance system adjustment, hydronic system measurement and balancing, control system verification, and development and submittal of preliminary and final TAB reports to Engineer for approval prior to final acceptance.

#### 1.3 PRELIMINARY SUBMITTALS

- A. T&B contractor shall submit a written test and balance procedure, including schedule and sample forms, to the Engineer for approval prior to commencement of work.
- B. AABC or NEBB procedures and standard forms are acceptable.

#### 1.4 REQUIREMENTS, CONDITIONS, AND QUALIFICATIONS

- A. The T&B contractor shall be AABC certified to perform such work.
- B. The balancing methods and procedures shall be in accordance with the most recently published AABC guidelines.
- C. The contractor shall perform two individual testing services:
  - 1. Preliminary duct pressure testing and unit airflow verification
  - 2. Final test and balance
  - 3. Note: reports are required for each testing service.
- D. All balancing and measuring equipment shall be calibrated within one year of the test and balance work.

### PART 2 – PRODUCTS

Not Used.

### PART 3 – EXECUTION

- 3.1 Recommendations outlined by the AABC and NEBB are to be followed for air and water measurement, adjustment, and reporting.
- 3.2 The contractor shall completely review all drawings, including field changes and equipment substitutions, to thoroughly acquaint themselves with the work to be completed.

- 3.3 The contractor shall coordinate his work closely with the work of other trades, including scheduling of work efforts, installation of devices and accessories, location of components and equipment, power wiring, and testing requirements.
- 3.4 Measure, adjust and balance, and re-measure airflows at each outlet within -5% to +10% of the design airflows indicated on the drawings.
- 3.5 Measure main supply and return ducts using the pitot traverse method, and make necessary adjustments to equipment to achieve rated airflow. Such adjustments may include sheave adjustments, setpoint changes to variable frequency drives, modifying operating level of manual steady-state speed controllers, and/or manipulation of dampers. Units shall operate within 10% +/- of scheduled rating.
- 3.6 Provide complete test and balance report, along with schematic drawings indicating tags and notations where measurements were taken. For example, if Room 123, Air Device 1 is listed at 225 cfm, provide sketches or a key plan to indicate which room and which diffuser correlates to the data point.
- 3.7 The contractor shall be responsible for adjusting the system if the report indicates system performance does not meet the specified criteria. At the architect's / Engineer's request, the contractor shall perform such testing under their supervision.
- 3.8 As a condition of Project Closeout, the Architect / Engineer will require a random sampling of no less than 10 locations where measurements will be made to verify the integrity of the data and proper operation of the system. If the data appears inaccurate, or if the system appears to be malfunctioning, the contractor shall rebalance the system at no charge to the Owner.

END OF SECTION

## SECTION 23 07 00 – MECHANICAL INSULATION

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions, and other Sections of Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This section includes pipe and duct insulation for mechanical installations. Products and methods outlined herein include: fiberglass ductwrap insulation, fiberglass pipe insulation, rigid ductwork insulation (closed cell polyurethane), Armaflex / Rubatex foam insulation systems, internal duct insulating fiberglass liner, water vapor barriers, sealants and coatings, and jackets for interior and exterior applications.
- B. Insulation thickness and ratings shall comply, as a minimum, with ASHRAE 90.1 (“Energy Code”).

#### 1.3 FIRE PROPERTIES

- A. All insulation material, including jackets and sealants, utilized on interior installations, shall have a Flame Spread Rating of 25 or less, and shall have a Smoke Developed Rating of 50 or less, when tested in accordance with ASTM E84.
- B. Insulation materials must be clearly marked by the manufacturer that the requirements outlined above are met.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Insulation materials shall be brought to the site in original containers, shall be kept free from heat and moisture, and shall be clearly marked with maximum temperature ratings, type and grade, and Flame Spread / Smoke Developed ratings.

#### 1.5 SCHEDULING

- A. Insulation shall not be applied until ductwork and piping systems have been tested and approved.
- B. In areas where exposure to the elements is inevitable (rooftop applications), insulation, vapor barrier, and jacketing must be applied as quickly as possible to prevent degradation of metal duct and piping components.

### PART 2 – PRODUCTS

#### 2.1 MANUFACTURERS

- A. Acceptable manufacturers include:
  - 1. CertainTeed

2. Owens-Corning
3. Schuller International
4. Knauf Fiberglass
5. Armstrong (Flex Elastomeric)
6. Rubatex (Flex Elastomeric)

## 2.2 INSULATION MATERIALS

- A. Mineral Fiber Board Insulation (duct and equipment): glass fibers bonded in thermosetting resin, complying with ASTM C612, Type IB, without facing and with all-service jacket manufactured from kraft paper, reinforcing scrim, aluminum foil, and vinyl film.
- B. Mineral Fiber Blanket Thermal Insulation (duct): glass fibers bonded with a thermosetting resin, complying with ASTM C553, Type II, without facing and with all-service jacket manufactured from kraft paper, reinforcing scrim, aluminum foil, and vinyl film.
- C. Flexible Elastomeric Insulation (piping): closed-cell, sponge or expanded rubber materials, complying with ASTM C534, Type I for tubular materials and Type II for sheet materials, with recommended adhesive and UV protective coating (for exterior installations).
- D. Mineral Fiber Insulation (piping): glass fibers bonded with a thermosetting resin, complying with ASTM C547, Type I, with factory-applied all purpose vapor retarder jacket.
- E. Field Applied Jackets
  1. Foil and Paper Jacket: ASTM C921, Type I, laminated, glass-fiber-reinforced flame retardant kraft paper and aluminum foil.
  2. PVC Jacket: High impact, UV resistant, 20 mil thick, roll stock suitable for shop or field cutting and forming. Adhesive as recommended by manufacturer and standard color as white.
  3. PVC Fitting Covers: High impact, UV resistant, 20 mil thick, factory fabricated for various fittings, elbows, tees, and valves. Adhesive as recommended by manufacturer and standard color as white.
  4. Aluminum All-Weather Service Jacket: Weathertight system suitable for exterior (rooftop) applications. Stainless steel systems also acceptable.
- F. Vapor Retarders: Mastics shall be as recommended by the manufacturer, and are compatible with insulation materials, jackets, and substrates.

## PART 3 – EXECUTION

### 3.1 EXAMINATION

- A. Examine piping and ductwork prior to installation. Verify location and quantities of valves and other specialties requiring removable covers and access.
- B. Proceed with insulation work only after duct and pipe system pressure testing has been successfully completed and approved.

### 3.2 PREPARATION

- A. Ensure all surface to be insulated are clean and free of oil, mill scale, rust, duct, or other materials that will adversely affect the integrity of the insulating system.
- B. Ensure all surfaces are completely dry prior to insulating.

### 3.3 GENERAL APPLICATION REQUIREMENTS

- A. Apply materials in accordance with the manufacturer's written instructions, and in accordance with the product's listing.
- B. Refer to schedules at the end of this section for required thickness and jackets.
- C. All piping conveying fluids under 70°F at any time shall be insulated with a vapor barrier jacket.
- D. Apply piping insulation with longitudinal seams running along the length of the pipe.
- E. Apply ductwork insulation with tight longitudinal seams and end joints. Overlap and bond seams and joints with vapor retarder mastic or pressure sensitive tape having the same physical properties as the insulation facing.
- F. Seal all openings in insulation system (valve stems, hangers, supports, brackets, damper operators, actuators, etc.) with a vapor-retarder mastic, to provide a complete and continuous vapor barrier.
- G. Do not compress insulation during installation to any less than 80% of its nominal thickness.
- H. Where ductwork or piping passes through structural components (walls, slabs, roofs, etc.), continue insulation through the opening, unless prevented by presence of fire dampers, sleeves, couplings, etc. In the event of an obstruction, tightly butt insulation up against obstruction, and continue the vapor barrier up to the termination of the insulation.

### 3.4 INSULATION SCHEDULE

- A. Interior Supply, Return, and Outside Air Ductwork
  - 1. Material: Mineral Fiber Blanket
  - 2. Thickness: 1 ½" thick
  - 3. Jacket: Foil and Paper
  - 4. Vapor Retarder: Yes
  - 5. Note: Where indicated on drawings for ductwork to be lined, use 1" thick duct liner, 2.0 PCF, with anti-microbial agent applied to airstream surface.
- B. Domestic Cold and Hot Water and Interior Condensate Drain Piping
  - 1. Material: Flexible Elastomeric or Mineral Fiber
  - 2. Thickness: ½" thick
  - 3. Jacket: Exposed Locations – PVC  
Concealed Locations – Foil and Paper or PVC
  - 4. Vapor Retarder: Yes (cold water only)

- C. Exterior and Interior Refrigerant Piping
  - 1. Material: Flexible Elastomeric, 1" thick, with weatherproof vapor retarder mastic.
- D. Preinsulated Flexible Ductwork
  - 1. Material: Provide helical wire reinforced CPE core with double-reinforced metallized external vapor barrier, with minimum R value of 6.0. Thermaflex Pro series or equal.
- E. Internal Roof Drain Piping – Horizontal and First 10'-0" of Vertical Risers
  - 1. Material: 1-1/2" thick, 1.5 PCF ductwrap insulation with integral foil vapor barrier. Seal all joints and seams to prevent condensation.

END OF SECTION

## SECTION 23 09 00 – HVAC CONTROL SYSTEMS

### PART 1 – GENERAL

#### 1.1 RELATED SECTIONS

- A. The General Provisions of the Contract, including General and Supplementary Conditions, and various Sections of Division 15.

#### 1.2 SUMMARY

- A. This section includes component specifications and general performance-based specifications for the HVAC control systems, including: static pressure control, temperature control, humidity control, demand control ventilation, safeties and shutdown, coordination with work of Electrical Divisions, and compliance with the Sequences of Operation.

#### 1.3 QUALITY ASSURANCE

- A. Contractor shall provide a complete and function control system, and commission each system element to ensure operation in accordance with the specified Sequences of Operation.
- B. At the completion of the project, the Contractor shall provide all pertinent documentation regarding the control systems, including system architecture drawings (as-builts), final sequences of operation, operation and maintenance manuals for system components, and instruction information for operating personnel.

#### 1.4 SYSTEM TRAINING

- A. The Contractor shall be responsible for training Owner's representatives on the functioning and modification of the control systems, including setpoint adjustments, troubleshooting, clearing and resetting alarm conditions, resetting tripped safety devices, and general system maintenance.
- B. The Contractor shall be responsible for no less than 8 hours of on-site instruction for Owner's personnel.

### PART 2 – PRODUCTS

#### 2.1 GENERAL

- A. The Contractor shall provide all necessary devices, actuators, controllers, processors, panels, wiring, and accessories for a complete and functioning system to execute the requirements of the Sequences of Operation.
- B. The Contractor shall be responsible for coordination of work with other trades, including device installation, power wiring, safeties and shutdown controls, equipment interlock, factory-furnished equipment, and general operation and testing of equipment.
- C. The Contractor shall closely coordinate with the Test and Balance Contractor to assist in the troubleshooting, testing, start-up, and balancing of the mechanical systems.

#### 2.2 EQUIPMENT AND MATERIAL

- A. All equipment shall be the standard production items of a systems contractor / manufacturer readily engaged in the Controls business. Such equipment shall be applied to each control system to satisfactorily perform the Sequences of Operation outlined herein.
- B. All wiring run in return air plenums shall be plenum rated, or installed in conduit.
- C. All power wiring not included under Division 16 shall meet the requirements of Division 16 and NFPA 70.
- D. Computer hardware shall be "Y2K Compliant".

### PART 3 – EXECUTION

#### 3.1 DEVICE LOCATIONS

- A. Coordinate with installing contractor to ensure devices, dampers, actuators, and accessories are installed with adequate space for service, repair, and removal.
- B. In general, mount thermostats where indicated on the drawings, between 54" and 60" AFF (above finished floor) unless noted otherwise. Coordinate with Architectural requirements and elevations in each space. Notify Architect immediately if a conflict arises.
- C. Relocation of any control device within 10'-0" of its original location shall be provided, at the Architect's / Engineer's discretion, at no charge to the Contract.

3.2 All work must comply with the requirements of NFPA 90A, NFPA 70, ASHRAE 90.1, and other applicable codes and standards.

3.3 Unitary controllers, devices, and equipment shall be BACNET compatible, and seamless integration between devices from different companies or manufacturers is required.

3.4 At the Project Closeout phase, provide complete O&M manuals, approved as-built drawings, approved submittals, and training information to the Owner.

3.5 Provide a one year warranty / service agreement for maintenance and troubleshooting of the system commencing upon final acceptance by the Owner. Provide a service agreement proposal to monitor, maintain, adjust, and troubleshoot the control systems for a period of one year after the warranty period expires.

#### 3.6 SEQUENCES OF OPERATION

Unit RTU-1 shall operate on a standard programmable heat-cool-auto thermostat user interface. The system shall be capable of time-of-day 5-1-1 schedule programming, with a minimum of 4 setpoints per day.

Upon a call for cooling or heating, the outside air damper shall open to its preset minimum setpoint. Upon unit shutdown, the damper shall close. The unit shall cease operation if smoke is detected via the unit smoke detector. Coordinate interlocks and smoke detector requirements with Fire Alarm contractor. See drawings for additional information concerning the Demand Control Ventilation (DCV) sequence.

END OF SECTION

## SECTION 23 20 00 – PIPING AND VALVES

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions, and other Sections of Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This section includes piping, fittings, and valves that are common to several Division 22 and 23 sections. The work and material described in this section includes: sanitary sewer piping, water distribution piping, drain piping (from equipment), refrigerant piping, isolation valves, balancing valves, and meters.

### PART 2 – PRODUCTS

#### 2.1 PIPE AND FITTINGS

- A. Provide pipe conforming to the following descriptions and standards. See Part 3 for applications.
  - 1. Standard Weight Steel Pipe 2" and smaller: seamless or butt-welded, black or galvanized (ASTM A53)
  - 2. Scheduled Steel Pipe, seamless or continuous steel pipe, black or galvanized (ASTM A53, Grade A)
  - 3. Steel Pipe Nipples: seamless galvanized or carbon steel pipe (ASTM A733, A53, and A106)
  - 4. Ductile Iron Pipe: Mechanical and push on joints, with AWWA C104 cement-mortar lining, conforming with AWWA C151, Classes 50 and 51.
  - 5. Flanged Ductile Iron Pipe: with barrel conforming to AWWA C115 Class 150 or 300, or with cement-mortar lining conforming to AWWA C104.
  - 6. Cast Iron Soil Pipe: pitch coated, hub-and-spigot soil pipe and fittings (ASTM A74)
  - 7. Hubless (No-Hub) Cast Iron Soil Pipe: service weight cast iron soil pipe with clamped neoprene connections (CISPI 301)
  - 8. Seamless ACR Copper Tube: Types K and L, ASTM B88, water tube, annealed temper.
  - 9. Hard Copper Tube: Seamless hard drawn copper tube, Type K, L or M, ASTM B88.
  - 10. Copper Drainage Tube: Type DWV, ASTM B306
  - 11. PVC Water Main: SDR/PR 160 hub-and-spigot with elastomeric gasket (ASTM D2672 and D3139)
  - 12. PVC Plastic Pipe: Schedules 40, 80, and 120 (ASTM D1785) and type DWV (ASTM D2665)
- B. FITTINGS
  - 1. Malleable Iron: black or galvanized, screwed or butt-welded fittings, 150 psi (ASTM/ANSI B16.3)

2. Cast Iron: black or galvanized screwed drainage fittings (ASME/ANSI B16.12); recessed drainage pattern (ASME B1.20.1)
3. Cast Copper Alloy Solder Joint Fittings: Equal to NIBCO (ASME/ANSI B16.18)
4. Cast DWV Fittings: (ANSI B16.23)
5. Wrought DWV Fittings: (ANSI B16.29)
6. Wrought Copper and Bronze Fittings: (ANSI B16.22)
7. Wrought Copper Drainage Fittings: (ANSI B16.23)
8. Bronze Flanges: (ANSI B16.24, Classes 150 and 300)
9. Steel Butt-Welded Fittings: (ANSI B16.9)
10. Grooved Steel Pipe and Fittings: Equal to Grinnell "Gruv-Lok" or Victaulic
11. Ductile Iron and Gray Iron gasketed fittings: AWWA C110 standard pattern or AWWA C153 compact pattern, 250 psig min pressure rating, with AWWA C104 cement-mortar lining and AWWA C111 rubber gaskets.
12. Thredolets and Weldolets: Approved.

#### C. VALVES

1. Bronze Valves, 2" and less: threaded ends
2. Ball Valves, 4" and less: blowout proof, 3-piece construction, standard or conventional port, chrome-plated brass ball, RTFE seats and seals, threaded or flanged end connections
3. Ferrous Valves, 2 ½" and up: flanged ends
4. Valve Temperature and Pressure Ratings: not less than system pressure specified
5. Valve Sizes: same as upstream pipe size, unless indicated otherwise.
6. Extended Valve Stems: Required on all insulated valves
7. Valve Flanges: ASME B16.1 (cast iron), ASME B16.5 (steel), and ASME B16.24 (bronze)
8. Valve Grooved Ends: AWWA C606
9. Threaded: per ASME B1.20.1
10. Valve Bypass and Drain Connections: MSS SP-45

### PART 3 – EXECUTION

#### 3.1 PIPE APPLICATIONS

##### A. Pipe Schedule

1. Above Grade Sanitary Sewer and Vent: No-Hub Service Weight Cast Iron with Neoprene Sleeves –OR-- PVC
2. Domestic Water Distribution: Type L Hard Drawn Copper with solder-joint fittings
3. Equipment Drains: Copper Type DWV with solder-joint fittings
4. Refrigerant Piping: Type L Hard Drawn Copper with soldered fittings

##### B. General Pipe Installation Requirements

1. Route piping in concealed locations unless noted otherwise.
2. Install piping at required slope and support at required intervals for type of pipe and temperature of conveyed fluid.
3. Provide proper hangers and supports to secure piping systems to structure. Provide ¼" stainless steel rods to suspend below-slab piping from slab reinforcing iron.

4. All components of an individual piping system shall be rated at or above the pressure and temperature ratings for the entire system.
5. Locate groups of piping in parallel, and, in general, run parallel to building lines and structure.
6. Install piping free of sags and bends, and limit unnecessary changes of direction.
7. Coordinate location, including relative height of installation, with work of other trades. Generally speaking, gravity drain piping shall take precedence over forced main and pressure piping.
8. Secure piping to structure while allowing for compression and expansion of piping.
9. Leaking joints shall be remade using new materials. Paint, caulk, or other methods of sealing leaks is forbidden.
10. Install pipe escutcheons through all wall, floor, and ceiling penetrations, regardless of whether the penetration is concealed or not.
11. Install sleeves where piping passes through floors, walls, and roof sections. Fill and caulk the annular space for a water-tight seal, and ensure caulking is installed in accordance with its listing for penetrations in fire-resistive construction (fire and fire/smoke barriers).

### 3.2 VALVE APPLICATIONS

#### A. Valve Schedule

1. Water Shutoff Service: Ball or Butterfly
2. Throttling Service: Ball

#### B. General Valve Installation Requirements

1. Inspect valve and turn through entire service range prior to installation to ensure proper functioning.
2. Examine threads on threaded valve ends to verify no damage has taken place and threads are clean.
3. Align mating flanges and verify bolt holes and gasket assembly matches.
4. Do not attempt to repair or rebuild damaged valves – replace with new.
5. Install valves with unions or flanges at pieces of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
6. Locate valves for easy access and inspection.
7. Install valves in horizontal piping with stems at or above center of pipe.
8. Install isolation valves at each branch or riser connections to mains or as indicated.
9. On solder-joint valves with plastic components, take caution not to exceed temperature rating of plastic components during soldering activity.
10. Install hose-end drain valves at the base of each riser, at low points in the system, and where required to drain water piping.
11. Valve and Piping for Fire Protection Systems are outlined in Section 15300.

### 3.3 PRESSURE TESTING, FLUSHING, AND CHEMICAL TREATMENT

- #### A. Pressure test all piping systems prior to covering.

1. For gravity systems, block downstream discharge at connection to existing utilities, and fill with water. Inspect piping system after six hours to determine if leaks are present. Repair or replace leaking components as required.
2. For pressure systems, test piping at 125 psig for a minimum of 2 hours. Repair or replace leaking components as required.
3. Remove temporary plugs in piping after testing is complete.

END OF SECTION

## SECTION 23 70 00 – HVAC DUCTWORK AND EQUIPMENT

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions, and other Sections of Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This section includes all equipment, material, and accessories for the HVAC systems, including: air handling units, condensing units, accessory electric heat, fans, ductwork, grilles, registers, diffusers, balancing dampers, start-up and warranty requirements, and service warranty contract requirements.

#### 1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver equipment, ductwork, controls, actuators, safeties, grilles and registers, dampers, electrical components, and accessories in their original shipping containers, and store off of the ground and protect from extremes in temperature and moisture. Electrical and control components shall be stored in a climate-controlled area prior to installation.
- B. Equipment or material damaged during delivery, storage, or handling will not be accepted. Replace damaged material or equipment with new.

### PART 2 – PRODUCTS

#### 2.1 MANUFACTURERS

- A. HVAC Equipment –Packaged Rooftop Units (note options, accessories, and model numbers on plans)
  - 1. Trane
  - 2. York
  - 3. Carrier
  - 4. Approved Equal
- B. Fans
  - 1. Greenheck
  - 2. Cook
  - 3. Approved Equal
- C. Air Devices (Diffusers, Grilles, and Registers)
  - 1. Titus
  - 2. Kreuger
  - 3. Approved Equal

## D. Ductless Mini-Split Systems

1. Mitsubishi
2. Daikin
3. LG
4. Sanyo
5. Approved Equal

## 2.2 DUCTWORK AND ACCESSORIES

- A. All ductwork, except where specifically provided by unit manufacturer, shall be of galvanized steel sheets of gauges and construction recommended by NFPA 90A and SMACNA for the pressure classification indicated, complete with all necessary angles, supports, reinforcements, and braces. All ductwork indicated is 2"SP pressure classification.
- B. All round take-offs from rectangular ductwork shall be made by means of a "Genflex" Model SM-ID spin in fitting with integral butterfly damper and quadrant operator or equal.
- C. Fire dampers, where ducts pass through fire rated partitions with a fire resistance rating of 1 hour or more, shall be U.L. listed, with fusible link rated for operation at 165 degrees F, equal to Ruskin Model DIBD-2. All fire and combination fire/smoke dampers shall be installed in accordance with their listing.
- D. All changes in direct greater than 60° shall include single-thickness turning vanes.
- E. Rectangular take-offs in rectangular ductwork shall be made by 45° fittings with opposed blade balancing damper. Provide extended operator on damper to extend beyond the insulation and jacketing.
- F. Pre-Insulated Flexible Ductwork shall be minimum R=6.0 with integral foil vapor barrier and wire-reinforced CPE inner core, equal to Thermaflex Pro Series.

## 2.3 SPLIT SYSTEMS

- A. Units shall be as scheduled on the drawings, specific to the model numbers and listed accessories, or pre-approved equal.
- B. Air Handling Units are of double-wall construction with fiberglass or injected foam insulation, vertical configuration, with vertical discharge.
- C. Contractor shall coordinate with unit manufacturer, and shall furnish and install all required refrigerant piping and accessories, including TXV's, accumulators, sight glasses, filters, etc.

## PART 3 – EXECUTION

## 3.1 EXAMINATION

- A. The Contractor shall familiarize himself with the site conditions, including delivery and rigging obstructions, roof locations, structural supports, opening and chases in the building envelope,

waterproofing and flashing requirements, and other items pertinent to the installation of the mechanical equipment and ductwork.

### 3.2 COORDINATION BETWEEN TRADES

- A. The Contractor shall closely coordinate his work with the work of other trades. Arrange for slots, opening, and chases in the building prior to building construction.
- B. Contractor shall coordinate roof curb slope, materials of construction, and installation requirements with roofing contractor and framing contractor. Mechanical contractor shall furnish the accessory roof curb, for installation by the general contractor.
- C. Closely coordinate options and accessories furnished with the unit that impact the work of other tradesmen. Verify voltage and phase of equipment prior to procurement.
- D. Arrange for connections of safeties and shutdown controls with the fire alarm contractor. Ensure proper voltage and phase are provided at the unit.

### 3.3 INSTALLATION

- A. Ductwork and accessories shall be manufactured, assembled, and installed in strict accordance with published recognized standards, including SMACNA and NFPA 90A.
- B. In general, pitched piping takes precedence over ductwork. Arrange ductwork generally parallel to building lines, and suspend and reinforce ductwork as recommended by SMACNA. Under no circumstances shall piping, conduit, or other ductwork be suspended from ductwork. Where multiple trades are in alignment, the use of multi-level trapeze style hangers may be used.
- C. Furnish and install fire damper in accordance with the manufacturer's written instructions and the product's listing. Provide dampers where indicated on the plans, and whenever a duct passes through a fire rated partition of one hour or more. (Exception: Where ductwork is less than 100 square inches and extends no less than 5'-0" from the fire rated partition penetration, the fire damper may be omitted. See plans for locations and requirements.)
- D. Route Type L hard drawn copper tubing or flexible copper tubing for split system refrigerant piping. Insulate the suction piping with minimum ½" flexible elastomeric insulation with recommended adhesive and UV-resistant coating (for exterior installations). Affix piping to building structure. Do not allow contact between copper tubing and steel building components or other ferrous piping.
- E. Coordinate closely with the requirements of the Controls Section of this specification. Accommodate wiring and control devices as outlined in the drawings and in these specifications.

### 3.2 SYSTEM START UP AND COMMISSIONING

- A. All units shall be started and any problems shall be troubleshooted until units perform satisfactorily and meet the capacity requirements outlined in the schedule.
- B. All ductwork must be clean and free of debris at system start-up. Provide rough filters during system operation prior to Project Closeout. Change filters at Project Closeout with new.

- C. Coordinate with Controls Contractor to ensure unit is operating satisfactorily in both cooling and heating mode operation. Make required adjustments to ensure unit is operated at scheduled capacity.
- D. Do not operate unit during construction activities, including drywall installation and sanding practices. Protect system from dust and debris throughout construction with use of high-efficiency filters with rough pre-filters.

END OF SECTION

## SECTION 26 01 00 – BASIC ELECTRICAL REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. All drawings and general provisions of the contract, including General Conditions, Supplementary Conditions, and other Division 1 Specifications, apply to this section.
- B. Separation of Specifications into Sections is for convenience only and is not intended to establish limits of work or liability. The following sections apply to this project:

- 260100 – Basic Electrical Requirements
- 260500 – Basic Electrical Materials and Methods
- 262000 – Panelboards
- 265000 – Lighting Fixtures

#### 1.2 DESCRIPTION OF WORK

- A. Furnish all labor, tools, materials, fixtures, equipment, accessories, transportation, etc., required for a complete electrical lighting and power systems, complete with necessary auxiliaries as indicated on the drawings and specifications.
- B. Also included in the work is the power wiring for connection of items indicated on the architectural plans, as well as power and control wiring for the equipment specified in DIVISION 10- TOILET, BATH AND LAUNDRY ACCESSORIES, DIVISION 11- EQUIPMENT, DIVISION 21- FIRE SUPPRESSION, DIVISION 22 – PLUMBING, and DIVISION 23 – MECHANICAL.

#### 1.3 DRAWINGS AND SPECIFICATIONS

- A. The drawings showing the layout of electrical work indicate the approximate location of transformers, switchboards, panelboards, disconnects, outlets, and conduit routing. The contractor shall refer to architectural, structural, and mechanical drawings as well as equipment manufacturer's shop drawings and rough-in drawings, and adjust work accordingly to provide a coordinated installation. All adjustments and minor deviations necessary shall be made without additional cost to the owner. It shall be the electrical contractor's responsibility to see that all equipment such as pull boxes, junction boxes, panelboards, and other apparatus, that may require maintenance from time to time, are made accessible. Any condition that may occur during construction which conflicts with accessibility to the proposed installation of the electrical equipment, shall be brought to the Architect's attention prior to the point at which a change in location would require additional cost and delays to construction. The contractor shall install fire alarm devices as near as possible to the locations indicated on the drawings but shall move them as necessary to avoid conflicts with equipment, construction and to be located sufficiently away from heat producing objects.
- B. Smoke detectors, heat detectors, and visual devices shall be located in accordance with NFPA 72 including that the maximum distance between smoke detectors is 30' and the maximum distance from a wall is 15'. The contractor shall plan for contingencies to include providing additional smoke, heat, and visual devices if necessary.
- C. The drawings and specifications are complementary and what is shown and/or called for on one shall be furnished and installed the same as if shown and/or called for on the other.
- D. Where the Contractor is not certain about the method of installation, he shall ask the Architect for further installation details. Lack of details, not requested, will not be an excuse for improper installation.

#### 1.4 LAWS, CODES, AND PERMITS

- A. The latest accepted edition of the National Electrical Code (NFPA 70), National Fire Alarm Code (NFPA 72), and all State, Parish, City, and local building codes shall be considered a part of these specifications, and pertinent articles will not be repeated herein. These codes establish the minimum acceptable criteria where more stringent requirements have not been defined in these specifications and/or drawings.
- B. The Contractor shall apply for all permits and pay all fees incidental to completing the electrical work. This Contractor shall give notice to the proper authorities in ample time for the work to be inspected and approved as it progresses, and no work shall be concealed until inspected and approved by authorized inspectors. If the plans or these specifications in any way conflict with the Code, State or Local Rules, these latter are to be followed, without expense to the Owner, but the Architect shall be notified of this condition and approval secured before changes are made.
- C. Upon completion and before acceptance of work, a certificate of approval from the appropriate regulatory agency shall be furnished to the Architect through the Owner's Construction Manager.
- D. No work shall be concealed until approved by the local inspector. Local regulations shall be adhered to.
- E. The Contractor shall assure that he does not install electrical equipment including raceways in or through areas restricted by the International Building Code (IBC) and local building codes including elevator shafts and stairs.

#### 1.5 JOB SITE

- A. Prior to submitting quotation for electrical work, Contractor shall visit and examine the job site with all authorities concerned in order to become familiar with all existing conditions pertinent to the work to be performed thereon. No additional compensation will be allowed for failure to be so informed.
- B. Where existing equipment including raceways and wiring is in conflict with work of this project, the Contractor shall rework/reroute/relocate this equipment as necessary.

#### 1.6 TEMPORARY POWER

- A. The Contractor shall be responsible for providing temporary light and power to the construction site as necessary to meet all of the OSHA requirements for construction, and as required by the general contractor and various sub-contractors.

#### 1.7 SERVICE INTERRUPTIONS

- A. Services to the existing buildings shall be kept in operation at all times during construction. If a situation occurs that the service needs to be interrupted, the Contractor shall be responsible for contacting the proper authorities to schedule the outage at a time that is convenient to the occupants. It shall be understood that this outage may have to be scheduled after regular working hours or on the weekends. Allowances shall be added to the Contractors bid to cover the cost of any overtime work. This shall come at no additional cost to the Owner after the bid date.

#### 1.8 WARRANTY

- A. The contractor shall guarantee all labor and materials for a period of twelve (12) months from the date of final acceptance. All defective materials and work shall be replaced with new materials or equipment. This shall come at no additional cost to the Owner.
- B. Provide special warranties for equipment warranted for longer than twelve (12) months, as specified in electrical sections.

## **PART 2 – PRODUCTS**

### **2.1 MATERIALS**

- A. Equipment and materials shall be new and shall be listed by Underwriters Laboratories for the purpose for which they are being used. All material of similar use shall be of the same manufacturer.
- B. Substitutions to materials listed on the drawings and specifications are permitted only in accordance with Division 00 and 01 of the project manual.
- C. All termination lugs shall be rated 75 degree C minimum and shall be compatible with the number and size of wires to be terminated.

### **2.2 SUBSTITUTIONS**

- A. Names of manufacturers or catalog numbers are mentioned herein in order to establish a standard as to design quality. Other products similar in design and of equal quality may be used if submitted to the Architect through the Owner's Construction Manager and found acceptable by him. Refer to Divisions 00 and 01 of the project manual.
- B. When the contractor elects to use an acceptable alternate manufacturer's equipment, the contractor shall be responsible to coordinate the change with all trades affected and pay for any additional work required under this or any other division affected by the substitution.

### **2.3 SUBMITTALS**

- A. Within thirty days of the award of the contract, the Contractor shall be responsible for submitting six (6) copies of submittals containing catalog cuts and performance data for all material and equipment proposed for use. These submittals shall be reviewed by the Architect for general compliance to the contract documents. The Architect's review of these submittals in no way modifies the contract or relieves the Contractor from compliance with the contract unless a difference is clearly stated in the submission and specific acceptance is given by the Architect as a change to the contract.
- B. Submittals shall be identified with the project name and the Contractors name and have the Contractor's stamp showing that he has reviewed the submittal and found it to be in accordance with the plans and specifications. Items of division 26 and 27 shall be submitted in one package.
- C. Submittals that do not comply with the above will be returned, without review, for resubmission.
- D. All shop drawings must be reviewed before the various factories start fabrication.

## **PART 3 – EXECUTION**

### **3.1 INSTALLATION**

- A. Ask for details whenever uncertain about installation method. Lack of details requested shall not excuse proper installation and corrections shall be the responsibility of the Contractor.

### **3.2 AS-BUILT DRAWINGS & OPERATING INSTRUCTIONS**

- A. The Contractor shall be responsible for providing Record drawings to the Architect at the completion of the project. The Contractor shall make a reproducible set of the original contract drawings, and in a neat and understandable

manner show any significant changes made during construction. Unless noted otherwise in the contract documents, the Contractor shall provide one additional copy of these drawings to the Architect. The Contractor shall pay for all

reproduction costs. Final payment shall be withheld until these drawings are accepted by the Architect.

- B. The Contractor shall furnish two bound sets of any operating instructions and maintenance manuals to the Architect upon completion of the project.

### 3.3 CUTTING AND PATCHING

- A. The Contractor shall be responsible for all cutting and patching that is required to complete the installation of the electrical systems. All work shall be coordinated between trades with strict accordance with the requirements of the General Conditions. Structural members shall not be cut or modified without the approval of the architect.
- B. The Contractor shall be responsible for covering, caulking, or otherwise to make weatherproof all openings left in the structure for electrical work. This includes openings around conduit penetrations.

### 3.4 EXCAVATING AND BACKFILLING

- A. The Contractor shall be responsible for all excavating and backfilling required to complete the installation of the electrical systems. All excess material and debris shall be removed. All backfilling shall be with sand. Backfilling shall be thoroughly tamped and compacted.
- B. It shall be the Contractor's responsibility to locate all underground utilities before trenching and excavating. Care shall be taken to avoid damage to the existing utilities. Any damage shall be repaired or replaced by the Contractor at no expense to the Owner.

### 3.5 PAINTING

- A. No painting shall be required under DIVISION 26 and 27, except for factory-finished items and as noted. Any damaged surfaces of factory items shall be repaired by the Contractor to an acceptable level determined by the Architect.

### 3.6 EXISTING EQUIPMENT

- A. The Contractor shall be responsible for the removal and reinstallation of any electrical equipment, such as light fixtures, that shall be reused. Any existing electrical equipment that is removed and not reused shall be returned to the Owner. Any material that the Owner does not wish to keep shall be removed from the site by the Contractor.
- B. When existing electrical items such as outlets are removed from service, care shall be taken to keep the integrity of the remaining electrical systems.

END OF SECTION 260100

## SECTION 26 05 00 - BASIC ELECTRICAL MATERIALS AND METHODS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Raceways.
  - 2. Wires, cables, and connections
  - 3. Wiring devices
  - 4. Grounding
  - 5. Safety Switches and fuses
  - 6. Supporting devices for electrical components.
  - 7. Equipment for utility company's electricity metering.

#### 1.2 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories shall be listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Devices for Utility Company Electricity Metering shall comply with utility company published standards.
- C. Comply with NFPA 70.

#### 1.3 COORDINATION

- A. Coordinate chases, slots, inserts, sleeves, and openings for electrical supports, raceways, and cable with general construction work.
- B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment that requires positioning before closing in the building.
- C. Coordinate electrical service connections to components furnished by utility companies.
- D. Coordinate installation and connection of exterior underground and overhead utilities and services, including provisions for service entrances and electricity-metering components.
- E. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces.
- F. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.

### PART 2 - PRODUCTS

#### 2.1 RACEWAYS

- A. EMT: Electrical metallic tubing; ANSI C80.3, zinc-coated steel.

- B. FMC: Flexible metal conduit; zinc-coated steel.
- C. IMC: Intermediate metal conduit; ANSI C80.6, zinc-coated steel, with threaded fittings.
- D. LFMC: Liquidtight flexible metal conduit; zinc-coated steel with sunlight-resistant and mineral-oil-resistant plastic jacket.
- E. RMC: Rigid metal conduit; galvanized rigid steel; ANSI C80.1.
- F. RNC: Rigid nonmetallic conduit; NEMA TC 2, Schedule 40 or 80 PVC, with NEMA TC3 fittings.
- G. Raceway Fittings: Specifically designed for raceway type with which used.

## 2.2 WIRES, CABLES, AND CONNECTIONS

- A. All conductors shall have 600V insulation type THHN/THWN.
- B. Conductors, No. 10 AWG and Smaller: Solid or stranded copper.
- C. Conductors, Larger Than No. 10 AWG: Stranded copper.
- D. No wire shall be smaller than #12 AWG unless noted otherwise.
- E. All conductors shall be copper.
- F. Insulation: Thermoplastic, rated 600 V, 90 deg C minimum, Type THW, THHN-THWN, or USE depending on application.
- G. Wire Connectors and Splices: Units of size, ampacity rating, material, type, and class suitable for service indicated.

## 2.3 WIRING DEVICES

- A. Wall Switches shall be 20A, 277V, AC type designed for quiet operation.
- B. Duplex receptacles shall be 20A/2 pole, 3-wire, 125V, grounding type.
- C. All devices shall be specification grade Hubbell, Leviton, or equal.
- D. All device plates shall be brushed stainless steel with matching counter sunk screws unless noted otherwise.
- E. Consult with the Architect for color selections before ordering devices.
- F. Use multi-gang plates where devices are grouped together.
- G. Boxes and fittings shall comply with article 370 of the NEC. Particular attention shall be paid to the number of conductors allowed in an outlet box or junction box. Contractor shall make provisions to prevent overcrowding outlet and junction boxes regardless of the number of conductors shown on the plans at the outlets.

## 2.4 GROUNDING

- A. The grounding system shall be in accordance with N.E.C. Article 250.

- B. A grounding conductor shall be provided in all conduit.

## 2.5 SAFETY SWITCHES AND FUSES

- A. Safety switches shall be of the quick-make, quick-break, heavy-duty, fusible or non-fusible type with cover interlock to prevent opening of the door when the switch is in the "ON" position. Use NEMA 3R enclosures outdoors and NEMA 1 enclosures indoors, unless otherwise noted.
- B. Provide a complete set of dual-element, class RK-1 fuses of ampere rating shown on the drawings. Furnish the owner with 20% spare fuses with at least one set for every rating.
- C. All fuses shall have a minimum interrupting rating of 200,000 A.

## 2.6 SUPPORTING DEVICES

- A. Material: Cold-formed steel, with corrosion-resistant coating.
- B. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.
- C. Slotted-Steel Channel: Flange edges turned toward web, and 9/16-inch- diameter slotted holes at a maximum of 2 inches o.c., in webs. Strength rating to suit structural loading.
- D. Slotted Channel Fittings and Accessories: Recommended by the manufacturer for use with the type and size of channel with which used.
- E. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.
- F. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.
- G. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for non-armored electrical cables in riser conduits. Plugs have number and size of conductor gripping holes as required to suit individual risers. Body constructed of malleable-iron casting with hot-dip galvanized finish.
- H. Expansion Anchors: Carbon-steel wedge or sleeve type.
- I. Toggle Bolts: All-steel springhead type.

## 2.7 EQUIPMENT FOR UTILITY COMPANY'S ELECTRICITY METERING

- A. Comply with requirements of electrical power utility company for current transformer cabinets, meter sockets, and modular meter centers.

## PART 3 - EXECUTION

### 3.1 ELECTRICAL EQUIPMENT INSTALLATION

- A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom.

- B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.
- C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.
- D. Right of Way: Give to raceways and piping systems installed at a required slope.

### 3.2 RACEWAY APPLICATION

#### A. Outdoor Installations:

1. Exposed: RMC.
2. Concealed: RNC.
3. Underground, Single Run: RNC.
4. Underground, Grouped: RNC.
5. Connection to Vibrating Equipment: LFMC.
6. Boxes and Enclosures: NEMA 250, Type 3R or Type 4, unless otherwise indicated.

#### B. Indoor Installations:

1. Exposed: EMT except in wet or damp locations, use IMC.
2. Concealed in Walls or Ceilings: EMT.
3. In Concrete Slab: RNC.
4. Below Slab on Grade or in Crawlspace: RNC.
5. Connection to Vibrating Equipment: FMC; except in wet or damp locations: LFMC.
6. Boxes and Enclosures: NEMA 250, Type 1, unless otherwise indicated.

### 3.3 RACEWAY AND CABLE INSTALLATION

- A. Conceal raceways and cables, unless otherwise indicated, within finished walls, ceilings, and floors.
- B. Exposed conduits shall be installed with runs arranged perpendicular to walls and ceilings.
- C. Keep legs of raceway bends in the same plane and keep straight legs of offsets parallel.
- D. Install pull wires in empty raceways. Leave at least 12 inches of slack at each end of pull wires.
- E. Connect motors and equipment subject to vibration, noise transmission, or movement with a maximum of 72-inches flexible conduit. Install LFMC in wet or damp locations. Install separate ground conductor across flexible connections.
- F. Set floor boxes level and trim after installation to fit flush to finished floor surface.
- G. Unless a larger size is indicated, raceways, troughs, and junction boxes shall be sized in accordance with the fill requirements of the NEC.

### 3.4 WIRING METHODS FOR POWER, LIGHTING, AND CONTROL CIRCUITS

- A. Application: Use wiring methods specified below to the extent permitted by applicable codes as interpreted by authorities having jurisdiction.
- B. Exposed Feeders: Insulated single conductors in raceway
- C. Concealed Feeders in Ceilings, Walls, and Gypsum Board Partitions: Insulated single conductors in raceway.
- D. Concealed Feeders in Concrete: Insulated single conductors in raceway.
- E. Exposed Branch Circuits: Insulated single conductors in raceway.
- F. Concealed Branch Circuits in Ceilings, Walls, and Gypsum Board Partitions: Insulated single conductors in raceway.
- G. Concealed Branch Circuits: Insulated single conductors in raceway.
- H. Underground Feeders and Branch Circuits: Insulated single conductors in raceway.
- I. Remote-Control Signaling and Power-Limited Circuits, Classes 1, 2, and 3: Insulated conductors in raceway unless otherwise indicated.
- J. Not Allowed: NM for branch circuits.
- K. Type MC cable shall NOT be acceptable.

### 3.5 WIRING INSTALLATION

- A. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- B. No wires shall be pulled in until the conduit system is complete. Ideal "Yellow 77" or other approved pulling lubricant shall be used.

### 3.6 ELECTRICAL SUPPORTING DEVICE APPLICATION

- A. Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, slotted channel system components.
- B. Dry Locations: Steel materials.
- C. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four with, 200-lb minimum design load for each support element.

### 3.7 SUPPORT INSTALLATION

- A. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.
- B. Size supports for multiple raceway or cable runs so capacity can be increased by a 25 percent minimum in the future.

- C. Support individual horizontal single raceways with separate, malleable-iron pipe hangers or clamps except use spring-steel fasteners for 1-1/2-inch and smaller single raceways above suspended ceilings and for fastening raceways to slotted channel and angle supports.
- D. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.
- E. Secure electrical items and their supports to building structure, using the following methods unless other fastening methods are indicated:
  - 1. Wood: Wood screws or screw-type nails.
  - 2. Gypsum Board: Toggle bolts. Seal around sleeves with joint compound, both sides of wall.
  - 3. Masonry: Toggle bolts on hollow block and expansion bolts on solid block. Seal around sleeves with mortar, both sides of wall.
  - 4. New Concrete: Concrete inserts with machine screws and bolts.
  - 5. Existing Concrete: Expansion bolts.
  - 6. Structural Steel: Spring-tension clamps.
  - 7. Light Steel Framing: Sheet metal screws.
  - 8. Fasteners for Damp, Wet, or Weather-Exposed Locations: Stainless steel.
  - 9. Light Steel: Sheet-metal screws.
  - 10. Fasteners: Select so load applied to each fastener does not exceed 25 percent of its proof-test load.

### 3.8 IDENTIFICATION MATERIALS AND DEVICES

- A. Install at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout Project.
- C. Install continuous underground plastic markers during trench backfilling, for exterior underground power, control, signal, and communication lines.

### 3.9 ELECTRICITY-METERING EQUIPMENT

- A. Install utility company metering equipment according to utility company's written requirements. Provide grounding and empty conduits as required by utility company.

### 3.10 FIRESTOPPING

- A. Penetrations through rated construction shall be sealed with a material capable of preventing the passage of flames and hot gases when tested in accordance with ASTM-EB14.
  - 1) Notify the Architect for inspection of all completed fire and/or smoke barrier walls before any construction is installed that would conceal construction and prevent a proper inspection. Access to random selected areas may be required by the Architect at the time of final inspection if this notification is not given.
  - 2) Provide detailed instructive cut sheets of the fire penetration sealing system used to the Architect at the time of inspection. Random selective sampling by the Contractor will be observed by the Architect and the Fire Marshall's inspector.

### 3.11 MOUNTING HEIGHTS

- A. Unless otherwise noted on the drawings or required by the Architect, the following mounting heights shall apply. Unless noted otherwise, mounting heights are to the centerline of the device:
1. Receptacles 18" above floor
  2. Toggle Switches 50" above floor
  3. Panelboards 72" to top
  4. Telephone Outlets 18" above floor
  5. Data Outlets 18" above floor
  6. Meter Can 60"-72" to centerline
- B. Mounting heights may be adjusted in masonry applications to simplify installation where approved by the Architect.

END OF SECTION 260500



## SECTION 26 20 00 - PANELBOARDS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes distribution and branch-circuit panelboards.

#### 1.2 SUBMITTALS

- A. Product Data: For each type of panelboard, overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard, including the following:
  - 1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following data:
    - a. Enclosure types and details for types other than NEMA 250, Type 1.
    - b. Bus configuration, and current, and voltage ratings.
    - c. Short-circuit current rating of panelboards and overcurrent protective devices.
    - d. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices.
  - 2. Wiring Diagrams: Power, signal, and control wiring.
- C. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.
- D. Operation and maintenance data.

#### 1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NEMA PB 1.
- C. Comply with NFPA 70.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Square D Co.
  - 2. Siemens Energy & Automation, Inc.

3. Eaton Corp.; Cutler-Hammer Products.

## 2.2 FABRICATION AND FEATURES

- A. Enclosures: Flush- and surface-mounted cabinets. NEMA PB 1, Type 1, suitable for environmental conditions at installed location.
  1. Outdoor Locations: NEMA 250, Type 3R.
  2. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
  3. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7C.
- B. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
- C. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.
- D. Directory Card: A clear plastic directory holder shall be mounted inside panelboard door.
- E. Bus: Hard-drawn copper, 98 percent conductivity.
- F. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.
- G. Panelboard Short-Circuit Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.
- H. Panelboards with Main Service Disconnect: Listed for use as service equipment.
- I. Spaces for Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.
- J. Feed-through Lugs: Locate at opposite end of bus from incoming lugs or main device.

## 2.3 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- B. Doors: Front mounted with concealed hinges; secured with flush latch with tumbler lock; keyed alike.

## 2.4 DISTRIBUTION PANELBOARDS

- A. Doors: Front mounted, and secured with vault-type latch with tumbler lock; keyed alike.
- B. Branch overcurrent protective devices shall be one of the following:
  4. Bolt-on circuit breakers.
  5. Fused switches.

## 2.5 INTEGRATED TRANSIENT VOLTAGE SURGE SUPPRESSION DEVICES

- A. Surge Protective Device (SPD)
  1. SPD shall be Listed and Component Recognized in accordance with UL 1449 Second Edition to include Section 37.3 highest fault current category. SPD shall be UL 1283 listed.

2. SPD shall be installed by and shipped from the electrical distribution equipment manufacturer's factory.
3. The TVSS devices in lighting and appliance panelboards shall be bus mounted between the main and branch devices. TVSS devices bussed off the end of the panelboard are not allowed. Panelboards with TVSS will accommodate thru-feed lugs and sub-feed circuit breakers in single section and multi-section panelboards.
4. The TVSS devices in power distribution panelboards shall be cable connected.
5. SPD shall provide surge current diversion paths for all modes of protection; L-N, L-G, N-G in WYE systems.
6. SPD shall be modular in design. Each mode including N-G shall be fused with a 200kAIR UL recognized surge rated fuse and incorporate a thermal cutout device. TVSS shall safely reach an end-of-life condition when subjected to fault current levels between 0 and 200 kA, including low level fault currents from 5 to 5000 amperes.
7. Audible diagnostic monitoring shall be by way of audible alarm. This alarm shall activate upon a fault condition. An alarm on/off switch shall be provided to silence the alarm. An alarm push to test switch shall be provided.
8. SPD shall meet or exceed the following criteria:
  - a. Minimum surge current capability (single pulse rated) per phase shall be:
    - 1) Service Entrance Panelboard locations: 240kA per phase
    - 2) Distribution and lighting and Appliance Panelboard locations: 160kA per phase
  - b. UL 1449 Suppression Voltage Ratings:
 

<u>VOLTAGE</u>	<u>LOCATION</u>	<u>L-N</u>	<u>L-G</u>	<u>N-G</u>
208Y/120V	Distribution:	400V	400V	400V
480Y/277V	Distribution:	800V	800V	800V
9. SPD shall have a minimum EMI/RFI filtering of up to -30 dB over the range of 100 kHz to 100 MHz.
10. SPD shall be provided with one set of NO/NC dry contacts.
11. The manufacturer of the electrical equipment in which the TVSS is installed shall warrant the integrated TVSS device to be free from defects in material and workmanship for a period of ten (10) years from the date of invoice the manufacturer or its authorized sales channel.

**2.6 OVERCURRENT PROTECTIVE DEVICES**

- A. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.
  1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
  2. GFCI Circuit Breakers: Single- and two-pole configurations with 5mA trip sensitivity.
  6. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
  7. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 55 percent of rated voltage. Verify exact voltage of shunt trip with fire alarm vendor.
- B. Fused Switch: NEMA KS 1, Type HD; clips to accommodate indicated fuses; lockable handle.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install panelboards and accessories according to NEMA PB 1.1.
- B. Mounting Heights: Top of trim 86 inches above finished floor, unless otherwise indicated. Highest switch or breaker at 72" max above finished floor.

- C. Mounting: Plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.
- D. Install filler plates in unused protective device spaces.
- E. Wiring in Panelboard Gutters: Arrange conductors into groups and bundle and wrap with wire ties after completing load balancing.
- F. Locate panelboards so that ratings are not reduced by heat from external sources.

### 3.2 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section "Basic Electrical Materials and Methods."
- B. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.
- C. Circuit Directory: Create a directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

### 3.3 FIELD QUALITY CONTROL

- A. Testing and Inspection: After installing panelboards and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
- B. Balancing Loads: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes as follows:
  - 1. Measure as directed during period of normal system loading.
  - 8. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data-processing, computing, transmitting, and receiving equipment.
  - 9. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
  - 10. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

**END OF SECTION 262000**

## SECTION 26 50 00 – LIGHTING FIXTURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Lighting fixtures with lamps and ballasts.
  - 2. Emergency lighting units.
  - 3. Exit signs.
  - 4. Accessories, including fluorescent fixture dimmers, occupancy sensors, etc
  - 5. Lighting control panel and switches.

#### 1.2 SUBMITTALS

- A. Product Data: For each type of lighting fixture scheduled, arranged in order of fixture designation. Include data on features, photometric data, accessories, and finishes.
- B. Product Certificates: For each type of ballast for dimmer-controlled fixtures, signed by product manufacturer.
- C. Operation and maintenance data.

#### 1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.
- C. Fixtures for hazardous locations shall be listed by Underwriters' Laboratory and labeled for indicated class and division of hazard.
- D. NFPA 101 Compliance: Comply with visibility and luminance requirements for exit signs.

### PART 2 - PRODUCTS

#### 2.1 LIGHT FIXTURES

- A. All light fixtures shall be as specified on the drawings.
- B. Fixtures to be installed in damp or wet locations shall be listed by Underwriters' Laboratory for that purpose.
- C. Recessed incandescent fixtures shall be provided with thermal protectors to automatically deactivate the fixtures due to overheating (fixtures shall be labeled by Underwriters' Laboratory for that purpose).
- D. Lamps shall be furnished and installed for all fixtures including fixtures furnished by others. Provide lamps of the proper type, wattage and voltage rating as specified in the contract documents.

- E. Fluorescent dimmers and fluorescent dimming ballasts shall be manufactured by the same manufacturer.
- F. Ballasts for operation of all fluorescent lamps shall be HPF Electronic with Class A Sound Rating.
- G. Fluorescent ballasts for operation of F32 T8 rapid start lamps shall be electronic high-efficiency type with the following characteristics:
  - 1. Lamps may operate in instant start mode.
  - 2. Operate multiple lamps as parallel circuit, operating remaining lamps at full light output upon failure of other lamps connected to the same ballast.
  - 3. Individual ballasts specifically designed and UL Listed are to operate one, two, three, or four lamps as scheduled on the drawings.
  - 4. Operate lamps at a frequency higher than 20 kHz.
  - 5. Operate a rated circuit voltage (120 OR 277 VAC) at an input frequency of 60 Hz, and tolerate +/- 10% sustained voltage variation without damage to the ballast, and maintain light output at +/- 10% voltage variation.
  - 6. Comply with EMI and RFI limits set by the FCC (CRF 47 Part 18) for non-consumer applications and not interfere with normal electrical equipment.
  - 7. Power Factor shall be not less than 0.95.
  - 8. Total Harmonic Distortion shall be less than 10%.
  - 9. Lamp Crest Factor shall be 1.7 or less.
  - 10. Ballast Factor shall be greater than 0.85 and less than 1.00.
  - 11. Sound rating shall be "A".
  - 12. Withstand transients shall be as specified by ANSI C.62.41 for location category A.
  - 13. Shall comply with applicable ANSI standards.
  - 14. Shall be provided with a three (3) year warranty.
- H. General: Comply with UL 924; for sign colors and lettering size, comply with authorities having jurisdiction.

### **PART 3 – EXECUTION**

#### **3.1 INSTALLATION**

- A. Light fixtures shall be set level, plumb, and square with ceilings and walls.
- B. Support for light fixtures in or on Grid-Type Suspended Ceilings shall be supported independently of the ceiling.
- C. Fixtures to be installed in or on painted ceilings and/or walls shall not be installed until painting is completed. Fixtures installed with paint applied over factory finishes will be rejected.
- D. Recessed fixtures shall be installed so that the trim flanges fit tightly and evenly against the surface of the ceiling.
- E. All locations of fixtures are approximate. The contractor shall refer to architectural plans for exact locations.
- F. In acoustical tile ceilings, recessed 2x2 and 2x4 fluorescent fixtures shall be installed so as to alleviate the necessity for cutting the tile.
- G. For acoustical tile ceilings, surface fixtures shall be centered on a tile or a tile joint, unless noted otherwise.
- H. All incandescent lamps shall be furnished inside frosted except where noted otherwise.
- I. T8 fluorescent lamps shall be four (4') feet long, bi-pin, rapid or instant start, 3500 K, 85 CRI, except where noted otherwise.

J. All H.I.D. lamps shall be phosphor coated, wattage as specified in the drawings.

**END OF SECTION 265000**



## SECTION 312000 – EARTHWORK

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Preparation of subgrades for building foundations and site paving.
2. Excavation and backfill within building lines for foundation and beams.
3. Excavation and backfill within building lines for under-slab mechanical and electrical work.
4. Placement and compaction of fill beneath foundations and site paving.

B. Related Sections:

1. Quality Control Requirements
2. Testing Laboratory Services.
3. Cast-In-Place Concrete.
4. Excavation and backfill associated with mechanical and electrical utilities and appurtenances.

#### 1.2 DEFINITIONS

A. Excavation: Removal of material to subgrade elevations indicated and subsequent disposal of materials removed.

B. Unauthorized Excavation: Removal of materials beyond indicated dimensions and subgrade elevations without specific direction of Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be at Contractor's expense.

1. Under grade beams, footings, foundation bases, or retaining walls, fill unauthorized excavation by extending bottom of concrete to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Architect.
2. In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Architect.

C. Subgrade: The undisturbed earth or the compacted soil layer immediately below subsequent construction.

D. Structure: Buildings and foundations.

E. Borrow: Fill or backfill material obtained off-site.

F. Earthwork for Building Foundations: Operations within limits as indicated on Drawings.

#### 1.3 QUALITY ASSURANCE

A. Codes and Standards: Perform earthwork in compliance with local codes, ordinances, and applicable requirements of authorities having jurisdiction.

B. Testing and Inspection Service: An independent testing and inspection laboratory selected and paid for by the Owner will perform soil testing and inspection service during earthwork operations.

#### 1.4 PROJECT CONDITIONS

- A. Existing Utilities: Contact owners of known and suspected underground utilities to identify types and locations of existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations.
1. If uncharted, or incorrectly charted, piping or other utilities are encountered during excavation, consult Architect immediately for directions. Cooperate with Owner and utility companies in keeping services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
  2. Do not interrupt in-use utilities except when permitted in writing and then only after acceptable temporary utility services have been provided.
  3. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.
- B. Use of Explosives: Use of explosives is not permitted.
- C. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.
1. Operate warning lights as recommended by authorities having jurisdiction.
  2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
  3. Provide erosion control to prevent displacement of soils and deposit of soil-bearing water runoff or airborne dust on adjacent properties and pavements.
  4. Perform excavation by hand within drip line of large trees to remain. Protect root systems from damage or dry-out to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap.
- D. Geotechnical Report: A geotechnical report for the project site is available from the Architect for the Contractor's general information and reference. No warranty of uniformity of soil conditions or depth to groundwater is implied by making the geotechnical report available to the Contractor.

## **PART 2 - PRODUCTS**

### 2.1 SOIL MATERIALS

- A. Structural Fill Material: Structural fill at building foundations and site paving shall be in accordance with the recommendations of the Geotechnical Report by Gillen Engineering and shall be free of organic material, clay lumps, and other deleterious materials.
- B. Unacceptable Materials: Materials from on-site excavation shall not be used for any purpose, unless approved by Architect. Excavated material shall be removed from the site unless otherwise directed by the Architect.

### 2.2 OTHER MATERIALS

- A. Warning Tape: Acid- and alkali-resistant polyethylene film tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility.
1. Detectable Tape: Provide tape with metallic core encased for corrosion protection, detectable by a metal detector when tape is buried up to 2'-6" deep.
  2. Tape Colors: Identify utility types by permanently colored tapes as follows:
    - a. Electric - Red.

- b. Gas, oil, steam, dangerous materials - Yellow.
- c. Telephone and other communications - Orange.
- d. Water - Blue.
- e. Sewers - Green.

### **PART 3 - EXECUTION**

#### **3.1 PROTECTION**

- A. General: Perform the work and provide temporary facilities to protect structures, utilities, sidewalks, pavements and other existing facilities and new construction from damage due to earthwork operations.
- B. Cold Weather Protection: Provide enclosures and insulating covers necessary to protect subgrades from damage due to freezing.

#### **3.2 SITE PREPARATION**

- A. General: Fill site by placing and compacting specified fill material in layers to grade elevations required.
- B. Preparation of Ground Surface The site shall be stripped of topsoil, any soft or loose soils, undocumented fill, silts, roots or other vegetation to a minimum depth of 6" or deeper as field conditions warrant. The site prep shall extend at least 5 feet beyond the edge of the building pads and site work. The exposed subgrade shall be proof rolled and inspected. The upper 8" of the exposed subgrade shall be scarified and re-compacted to at least 95% Standard Proctor Density.

#### **3.3 EXCAVATION**

- A. Description: Excavation is unclassified and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.
  - 1. Include removal of pavements and other surface obstructions, underground structures, utilities, and other items which are encountered, unless such items are indicated to remain.
- B. Unauthorized Excavation: Correct over-excavation as specified in PART 1.

#### **3.4 DEWATERING**

- A. Water Control: Prevent surface water and subsurface or ground water from flowing into excavations, from ponding on prepared subgrades, and from flooding project site and surrounding area. Protect subgrades from softening and damage by water accumulation.
- B. Water Removal: Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations and subgrades.
- C. Temporary Earthwork: Establish and maintain temporary dikes, drainage ditches and other diversions to control water flow and to convey rain water and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

#### **3.5 STORAGE OF EXCAVATED MATERIALS**

- A. Stockpiling: Stockpile acceptable excavated materials and borrow materials for backfill and fill where directed. Place, grade, and shape stockpiles for proper drainage.

1. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

B. Disposal: Dispose of excess excavated soil material and materials not acceptable for use as backfill or fill.

### 3.6 EXCAVATION FOR STRUCTURES

A. Extent of Excavations: Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection. Do not disturb bottom of excavations intended for bearing.

B. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive subsequent work. Concrete at footing excavations shall be placed same day as excavation is made. Concrete at grade beams shall be placed as soon as possible after excavation to avoid exposure of the grade beam bottoms to wetting and drying.

### 3.7 BACKFILL

A. General: Place soil material in layers to required subgrade elevations, using materials specified in Part 2 of this Section. Compact each layer to required density. Where compaction using hand-operated tampers is necessary, place and compact soil in layers one-half the thickness specified below.

1. At building foundations and Site Paving, place backfill in maximum 8-inches loose thickness layers and compact to at least the density specified under heading COMPACTION.

B. Related Work: Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, dampproofing.
2. Inspection, testing, approval, and recording locations of underground utilities.
3. Removal of concrete formwork.
4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials.
5. Removal of trash and debris from excavation.
6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

C. Conditions: Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Do not place backfill on surfaces that are muddy, frozen, or contain frost or ice.

D. Placement: Place backfill evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

### 3.10 COMPACTION

A. General: Control compaction, providing minimum percentage of density specified for each area classification indicated below. Correct improperly compacted areas or lifts if soil density tests indicate inadequate compaction.

B. Density Requirements: Compact each layer of fill and backfill to not less than the following percentages of maximum density, in accordance with ASTM Standards.

1. At building foundations and site paving, each layer of backfill and fill material at 95 percent

maximum dry density. ASTM D-698 (Standard Proctor).

- C. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, aerate soil to dry it, or uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations.
  - 1. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
  - 2. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

### 3.11 GRADING

- A. General: After compacting properly, uniformly grade areas, including adjacent transition areas, to provide smooth finished surface within specified tolerances, with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.
- B. Outside Structures: Grade areas adjacent to structures to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:
  - 1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 foot above or below required subgrade elevations.
- C. Under Structures: Grade surfaces smooth and even, free of voids, to required elevation. Provide final grades within a tolerance of ½ inch when tested with a 10-foot straightedge.
- D. Compaction: After grading, compact surfaces to the indicated density.

### 3.12 FIELD QUALITY CONTROL

- A. Quality Control Testing During Construction: Testing service to inspect and approve each subgrade, fill layer and pavement base before further backfill or construction work is performed.
- B. Samples of the proposed structural fill shall be obtained from the borrow pit and tested to verify conformance with these specifications prior to transporting the material to the site.
- C. Perform field density tests in accordance with ASTM D 1556 (sand cone method) or ASTM D 2167 (rubber balloon method), as applicable.
  - 1. Field density tests may also be performed by the nuclear method in accordance with ASTM D 2922, providing that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. In conjunction with each density calibration check, check the calibration curves furnished with the moisture gages in accordance with ASTM D 3017.
  - 2. If field tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Architect.
- B. Building Foundation and Sie Paving Areas: Perform at least one field density test for every 1,000 sq. ft. of area but in no case fewer than three tests. Perform tests on the following:
  - 1. Each layer of fill/backfill.

- D. Corrective Work: When testing agency reports that fills or backfills are below specified density, the Contractor shall perform additional compaction and testing, without additional cost to the Owner, until specified density is obtained.

### 3.15 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Corrections: Reconstruct subgrades damaged by freezing, rain, accumulated water, and construction activities, before subsequent construction commences. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances. Scarify or remove and replace material to depth necessary; reshape and recompact at optimum moisture content to the required density.
- C. Settling: Where pavement subgrade settling is measurable or observable before pavement is placed, add fill material, compact, and re-grade. Restore appearance, quality, and condition of surface to match adjacent work.

### 3.16 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Removal from Owner's Property: Remove waste materials, including excess borrow and excavated materials, trash, and debris, and dispose of it off Owner's property.

**END OF SECTION 31 20 00**

## SECTION 31 31 16 - TERMITE CONTROL

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Soil treatment with termiticide.
  - 2. Bait-station system.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of termite control product.
  - 1. Include the EPA-Registered Label for termiticide products.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Product Certificates: For termite control products, from manufacturer.
- C. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and include the following:
  - 1. Date and time of application.
  - 2. Moisture content of soil before application.
  - 3. Termiticide brand name and manufacturer.
  - 4. Quantity of undiluted termiticide used.
  - 5. Dilutions, methods, volumes used, and rates of application.
  - 6. Areas of application.
  - 7. Water source for application.
- D. Bait-Station System Application Report: After installation of bait-station system is completed, submit report for Owner's records and include the following:
  - 1. Location of areas and sites conducive to termite feeding and activity.
  - 2. Plan drawing showing number and locations of bait stations.
  - 3. Dated report for each monitoring and inspection occurrence indicating level of termite activity, procedure, and treatment applied before time of Substantial Completion.
  - 4. Termiticide brand name and manufacturer.
  - 5. Quantities of termiticide and nontoxic termite bait used.
  - 6. Schedule of inspections for one year from date of Substantial Completion.

- E. Warranties: Sample of special warranties.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located, and who employs workers trained and approved by manufacturer to install manufacturer's products, and who is accredited by manufacturer.
- B. Regulatory Requirements: Formulate and apply termiticides and termiticide devices according to the EPA-Registered Label.
- C. Source Limitations: Obtain termite control products from single source from single manufacturer.
- D. Preinstallation Conference: Conduct conference at Project site.

## 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.
- B. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.
- C. Install bait-station system during construction to determine areas of termite activity and after construction, including landscaping, is completed.

## 1.7 WARRANTY

- A. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.
  - 1. Warranty Period: Five years from date of Substantial Completion.

## 1.8 MAINTENANCE SERVICE

- A. Continuing Service: Beginning at Substantial Completion, provide 12 months' continuing service including monitoring, inspection, and re-treatment for occurrences of termite activity. Provide a standard continuing service agreement. State services, obligations, conditions, terms for agreement period, and terms for future renewal options.

## PART 2 - PRODUCTS

### 2.1 SOIL TREATMENT

- A. Termiticide: Provide an EPA-Registered termiticide, complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label

volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. BASF Corporation, Agricultural Products; Termidor.
  - b. Bayer Environmental Science; Premise 75.
  - c. Control Solutions, Dominion 21.
  - d. Speck2, Inc., Agreszor 75 WSP.
  - e. Univer, Inc., IMAX PRO.
2. Service Life of Treatment: Soil treatment termiticide that is effective for not less than five years against infestation of subterranean termites.

## 2.2 BAIT-STATION SYSTEM

- A. Provide bait stations based on the dimensions of building perimeter indicated on Drawings, according to manufacturer's EPA-Registered Label for product, manufacturer's written instructions, and the following:
  1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. BASF Corporation, Agricultural Products; Subterfuge.
    - b. Dow AgroSciences LLC; Sentricon System.
    - c. Ensystem, Inc.; Exterra System.
    - d. FMC Corporation, Agricultural Products Group; First Line.
    - e. Whitmire Micro-Gen Research Laboratories, Inc.; Advance TBS.
  2. No fewer than one bait station per 20 linear feet (6.1 linear meters).

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil per termiticide label requirements, interfaces with earthwork, slab and foundation work, landscaping, utility installation, and other conditions affecting performance of termite control.
- B. Proceed with application only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of termite control treatment. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.
- B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated except previously compacted areas

under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.

1. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

### 3.3 APPLICATION, GENERAL

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

### 3.4 APPLYING SOIL TREATMENT

- A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.
  1. Slabs-on-Grade: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
  2. Foundations: Adjacent soil, including soil along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
  3. Masonry: Treat voids.
  4. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.
- B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.
- C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.
- D. Post warning signs in areas of application.
- E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

### 3.5 INSTALLING BAIT-STATION SYSTEM

- A. Place bait stations according to the EPA-Registered Label for the product and manufacturer's written instructions, in the following areas that are conducive to termite feeding and activity:
  1. Conducive sites and locations indicated on Drawings.
  2. In and around infested trees and stumps.
  3. In mulch beds.
  4. Where wood directly contacts soil.
  5. Areas of high soil moisture.
  6. Near irrigation sprinkler heads.
  7. Each area where roof drainage system, including downspouts and scuppers, drains to soil.
  8. Along driplines of roof overhangs without gutters.
  9. Where condensate lines from mechanical equipment drip or drain to soil.
  10. At plumbing penetrations through ground-supported slabs.

11. Other sites and locations as determined by licensed Installer.
- B. Inspect and service bait stations from time of their application until Substantial Completion unless extended by continuing service agreement, according to the EPA-Registered Label for product and manufacturer's written instructions for termite management system and bait products.
  1. Service Frequency: Inspect bait stations not less than once every three month(s).

**END OF SECTION 31 31 16**



## **SECTION 31 62 00 – PILING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. This Section includes all piling, necessary labor, tools, and equipment to complete the work indicated on the drawings and specified.

#### **1.2 QUALITY ASSURANCE**

- A. Testing Laboratory Services: The Owner will select and pay for the services of an Independent testing laboratory to perform the following services.
  - 1. Record the type of hammer used.
  - 2. Document the pile length and circumference ( tip and butt ) of each pile at the job site.
  - 3. Prepare driving logs for each pile showing the number of blows per foot required for the entire pile length.

#### **1.3 DAMAGE TO EXISTING PROPERTY**

- A. Contractor shall investigate the existing adjacent buildings, sewers, and utilities and shall take proper and necessary precautions to protect same from damage due to the execution of the piling work. Should any damage occur due to the Contractor's negligence, the cost and responsibility for repairing or replacing the work to its original condition shall be borne by the Contractor at no cost to the Owner.

### **PART 2 - PRODUCTS**

#### **2.1 TIMBER PILES**

- A. Timber piles shall conform to A.S.T.M. D-25. Piles shall be of Southern Pine. Piles shall conform to Class B with a minimum tip diameter of 7 inches and a minimum butt diameter of 12 inches.
- B. Piles shall be pressure treated in accordance with the specifications of the American Wood Preservers Association to retain a minimum of 0.8 pounds per cubic foot of CCA treatment.
- C. All piles shall be 50 feet in length. The design load is 6 tons per pile.
- D. One Pile Load Test in accordance with ASTM D-1163 shall be conducted to verify the design load.

### **PART 3 - EXECUTION**

#### **3.1 HANDLING**

- A. Piles shall be carefully handled with no sudden dropping, breaking of outer fibers, bruising, or penetrating the surface with tools. Pile up or stacking of piles during construction is strictly prohibited.

3.2 DRIVING

- A. Piles shall be driven at a maximum rate of 20 blows per foot with a single acting air hammer developing 15,000 foot pounds of energy. All piles shall be driven straight and plumb and shall be driven continuously until pile reaches final embedment. Piles which upheave during the driving of adjacent piles shall be re driven to their original elevation. Piles whose centers are more than three inches off from their proper location shall be rejected and another pile shall be driven where directed by the Architect at no additional cost to the Owner.

3.3 CUT-OFF

- A. Piles shall be cut-off on a neat horizontal plane and the cut-off portions shall be removed from the job site. The tops of the piles shall be painted with three coats of CCA treatment.

3.3 DAMAGED PILES

- A. Any portion of pile split, battered, warped or damaged in any way shall not be accepted and shall be replaced by a new pile as directed by the Architect at no additional cost to the Owner. The tops of piles damaged during the driving shall be cut-off as specified herein under "Cut-off".

3.4 MISSING PILES

- A. Contractor shall be responsible for any pile omitted. Missing piles, at whatever stage of construction discovered, shall be provided at no additional cost to the Owner.

**END OF SECTION 31 62 00**

## SECTION 32 00 00 – BIRD PROOFING

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

- A. Submittals: Product data and Samples.

#### 1.2 SUMMARY

- A. Section includes bird proofing materials for the protection of the building and its occupants from birds lighting on exposed building components.

#### 1.3 RELATED SECTIONS

- A. Section 05 12 00 "Structural Steel" for substrates on which bird proofing materials will be attached.
- B. Section 09 91 13 "Exterior Painting" for coordination between steel finishes and bird proofing materials.

#### 1.4 QUALITY ASSURANCE

- A. Single Source Responsibility: Furnish products from one manufacturer for the entire project.
- B. Country of Origin: Product must be manufactured in the United States of America.
- C. All work must be performed in accordance with the manufacture's written directions.
- D. Installer must be authorized by the Manufacturer for the bird proofing materials specified.

#### 1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's descriptive literature and product specifications for each product including catalogs, installation instructions and other descriptive material.
- B. Warranty: Provide warranty on materials and installation.
- C. Samples: Provide samples of each type of bird proofing material specified, including fasteners and methods of fastening to substrates.
- D. Authorization: Provide written statement by Manufacturer that installer is authorized to install the specified bird proofing materials.

#### 1.6 PROJECT HANDLING

- A. Protect site delivered products from damage. Store in safe and dry location until installation.

- B. Protect installed materials from damage until final acceptance.

## 1.7 WARRANTY

- A. Products shall carry a minimum of 10 years guarantee against U.V breakdown and faulty manufacturing.
- B. Installation shall be guaranteed for 2 years.

## PART 2 - PRODUCTS

### 2.1 STAINLESS STEEL BIRD SPIKES

- A. Model BBG2001/3, as manufactured by Bird-B-Gone, Inc.; Mission Viejo, CA (Basis of Design).
  - 1. Width of coverage: 4" width.
  - 2. Height of spikes: 4-1/4."
  - 3. Spikes per foot: Minimum 40 in linear array with "no gap" center spike and non-staggered design.
  - 4. Base Strip: Flexible.
  - 5. Spike Thickness: Minimum 1.1mm (.05 Inch).
- B. Stainless Steel: Marine grade Type 316 stainless steel spikes.
- C. Polycarbonate: U.V stabilized.
- D. Mounting Systems: Exterior grade non-silicone based adhesive from or recommended by the Manufacturer to attach bird spikes to substrate. Also provide stainless steel fasteners to attach to substrate.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Visit site and be fully knowledgeable of the project to verify existing conditions, dimensions, and finishes where bird proofing materials will be installed.
- B. Verify appropriate sizes of bird proofing materials to be installed at each location.
- C. Do not proceed with installation until conditions are acceptable with the Manufacturer.

### 3.2 SURFACED PREPARATION

- A. Surface shall be thoroughly cleaned and free of bird droppings, nesting materials, rust, peeling paint, dust, dirt, and other debris.
- B. Paint shall be thoroughly complete and dry.
- C. Secure adjacent construction so no damage will occur to installed bird proofing materials.

### 3.3 INSTALLATION

- A. Install bird spikes in strict accordance with the Manufacturer's written directions.
- B. Install bird spikes the entire depth of the substrate surface, not just the perimeter. Space the materials in accordance with the Manufacturer's recommendations.
- C. Install bird spikes continuously, without gaps.

**END OF SECTION 32 00 00**



## SECTION 32 13 13 - PORTLAND CEMENT CONCRETE PAVING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This section includes all labor, materials, and equipment necessary to prepare subgrade to receive base course materials for concrete paving and to furnish and install base course materials and concrete paving as shown on Drawings complete with reinforcement.

#### 1.2 REFERENCE STANDARDS

- A. ACI - 301.
- B. ASTM C 150 - Portland Cement.
- C. ASTM C 94 - Ready-Mixed Concrete.
- D. ASTM C 260 - Air - Entraining Admixtures for Concrete.
- E. ASTM A 185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- F. ASTM A 615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
  
- G. ASTM C 33 - Concrete Aggregates.

#### 1.3 QUALITY ASSURANCE

- A. All concrete materials, workmanship and testing shall conform to the above referenced ACI 301, and the latest editions of the ACI, CSRI and ASTM Specifications and recommendations referenced therein.
- B. Refer to Section 01 40 00 for additional Quality Requirements.

#### 1.4 SUBMITTALS

- A. Mix proportions for each strength of concrete to be used, along with documentation of method used for developing the proportions (ACI 301, Article 3.8), shall be submitted for approval, and approval received, before use of mix.
- B. Other submittals or requests for approval as specified in ACI 301.

#### 1.5 INSPECTION AND TESTING

- A. Inspection and testing of concrete will be performed by a firm appointed and paid for by the Owner.
- B. Fill Material:
  - 1. The Testing Laboratory will perform compaction test for each layer of sand base course.
  - 2. Perform one (1) test in three locations.
  - 3. Location of test series will be determined by Testing Laboratory with approval of the Architect.
  - 4. When stabilizing base courses or portion thereof has been placed and compacted in accordance with requirements, notify the Testing Laboratory to perform density tests. Do not place concrete pavement until results have been verified and base course installation approved.
  - 5. If compaction tests indicate that stabilizing base courses or concrete paving do not meet specified requirements, remove defective work, replace and retest at Contractor's expense.

- C. Concrete:
  - 1. Inspection and testing will be performed in accordance with ACI 301.
  - 2. Provide free access to work and cooperate with appointed firm.
  - 3. Submit proposed mix design of each class of concrete to inspection testing firm for review prior to commencement of work.
  - 4. Tests of cement and aggregates may be performed to ensure conformance with requirements stated herein.
  - 5. Three (3) concrete test cylinders will be taken for every 100 or less cubic yards of each class of concrete placed.
  - 6. One (1) additional test cylinder will be taken during cold weather concreting, and be cured on job site under same conditions as concrete it represents.
  - 7. One (1) slump test will be taken for each set of test cylinders taken.

## **PART 2 - PRODUCTS**

### **2.1 FILL MATERIALS**

- A. Fill: In accordance with the recommendations of the Geotechnical Report.

### **2.2 BASE MATERIALS**

- A. Base: In accordance with the recommendations of the Geotechnical Report.

### **2.3 CONCRETE MATERIALS**

- A. Portland Cement: ASTM C 150; normal - Type I.
- B. Fine and Coarse Aggregates: ASTM C 33.
- C. Water: Potable.

### **2.4 REINFORCEMENT**

- A. Reinforcing Steel: 60 ksi yield strength; deformed billet steel bars; ASTM A 615; plain finish.
- B. Welded Steel Wire Fabric: Plain type, ASTM A 185; plain finish.
- C. Tie Wire: Minimum 16 gauge annealed type, or patented system acceptable to Architect.

### **2.5 FORMWORK AND ACCESSORIES**

- A. Formwork: Matched, tight fitting and adequately stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of concrete.

### **2.6 CONCRETE MIX**

- A. Mix and proportion to produce minimum 4000 psi compressive strength at 28 days with maximum slump of 3 inches and 4 to 6 percent air entrainment (ASTM C 94).
- B. Use accelerating admixtures in cold weather only when acceptable to Architect. Use of admixtures shall not relax cold weather placement requirements. Do not use calcium chloride.

- C. Use set retarding admixtures during hot weather only when acceptable to Architect. No admixtures are allowed without the written consent of the architect.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION OF SUBGRADE**

- A. Ensure rough grading has brought subgrade to required elevations.
- B. Fill soft spots and hollows with additional fill.
- C. Level and compact subgrade to 90% of maximum dry density.

#### **3.2 BASE COURSES**

- A. Check subgrade for conformity with elevations immediately before placing base course.
- B. Place sand base course material in compacted layers of not more than eight (8) inches thick.
- C. Base material to be compacted to 95% of maximum dry density at optimum water content as determined in accordance with AASHTO T99 (Method C). See Section 31 20 00 "Earthwork."
- D. Place polyethylene vapor retarder sheeting with the longest dimension parallel with the direction of the pour. Lap all joints 6 inches and seal with appropriate tape.

#### **3.3 FORMING**

- A. Form vertical surfaces to full depth and securely position to required lines and levels. Ensure form ties are not placed so as to pass through concrete.
- B. Arrange and assemble formwork to permit easy dismantling and stripping, and to prevent damage to concrete during formwork removal.

#### **3.4 PLACING REINFORCING**

- A. Reinforce concrete paving. Allow for minimum 1-1/2 inch concrete cover.
- B. Do not extend reinforcing through contraction joints.

#### **3.5 FORMING EXPANSION AND CONTRACTION JOINTS**

- A. Place contraction joints at intervals shown on plan.
- B. Fill expansion joints with asphalt board filler of required profiles. Recess 1/2 inch below finished concrete surface. See Section 32 13 73 for joint sealant specifications.
- C. Treat joints with weed killer as per requirements of State of Louisiana, Structural Pest Control Commission.

#### **3.6 PLACING CONCRETE**

- A. Remove all debris prior to pouring concrete.

- B. Place concrete, screed, and wood float surfaces to a smooth and uniform finish, free of open texturing and exposed aggregate.
- C. Avoid working mortar to surface.
- D. Round all edges, including edges of contraction joints.
- E. Provide exposed surfaces with broom finish.
- F. Ensure finished surfaces do not vary from true lines, levels or grades by more than 1/8" in 10' when measured with straightedge.
- G. Comply with placing procedures in ACI 301.

### 3.7 PAVING PATTERN

- A. See Drawings.

**END OF SECTION 32 13 13**

## SECTION 32 13 73 - PAVEMENT JOINT SEALANTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:  
  
Expansion and contraction joints within concrete pavement.
- B. Related Sections include the following:
  - 1. Section 32 13 13 "Concrete Paving" for constructing joints in concrete pavement.
  - 2. Division 7 Section "Joint Sealants" for sealing non traffic and traffic joints in locations not specified in this Section.

#### 1.3 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Verification: For each type and color of joint sealant required. Install joint-sealant samples in **3/4 inch** wide joints formed between two **6-inch** long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- C. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
- D. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
  - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
  - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for sealants.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

- C. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers for testing indicated below, samples of materials that will contact or affect joint sealants.
  - 1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
  - 2. Submit not fewer than (5) pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
  - 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
  - 4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
- D. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing of current sealant products within a 36-month period preceding the notice to proceed of the work.
- E. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 for testing indicated, as documented according to ASTM E 548.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials to comply with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

#### 1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
  - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.2. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (4.4 deg C).
  - 3. When joint substrates are wet or covered with frost.
  - 4. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  - 5. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

### 2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

### 2.3 COLD-APPLIED JOINT SEALANTS

- A. Bitumen-Modified Urethane Formulation: Type M; Grade P; Class 25; Uses T, M, and as applicable to joint substrates indicated.
  - 1. Products: Tremco Sealant/Waterproofing Division; Vulkem 202.

### 2.4 JOINT-SEALANT BACKER MATERIALS

- A. General: Provide joint-sealant backer materials that are non staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.
- B. Round Backer Rods for Cold- and Hot-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.
- C. Backer Strips for Cold- and Hot-Applied Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

### 2.5 PRIMERS

- A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint

configuration, installation tolerances, and other conditions affecting joint-sealant performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  1. Do not leave gaps between ends of backer materials.
  2. Do not stretch, twist, puncture, or tear backer materials.
  3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  1. Place sealants so they directly contact and fully wet joint substrates.
  2. Completely fill recesses provided for each joint configuration.
  3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  1. Remove excess sealants from surfaces adjacent to joint.
  2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions, unless otherwise indicated.
- G. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

3.4 CLEANING

- A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations with repaired areas are indistinguishable from the original work.

**END OF SECTION 02764**



## SECTION 32 31 29 – WOOD FENCES AND GATES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Wood fence with metal supports.
- B. Related Sections:
  - 1. Section 32 13 13 "Concrete Paving" for cast-in-place concrete fence post foundations.

#### 1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM)

#### 1.4 PERFORMANCE REQUIREMENTS

- A. General: In engineering wood fences and gates to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
  - 1. Wood and steel: The lesser of minimum yield strength divided by 1.65 or minimum ultimate tensile strength divided by 1.95.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal and wood fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
  - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for wood fences.
  - 1. Fence posts, rails, and fittings.

- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Show accessories, hardware, and operational clearances.
- C. Samples for Initial Selection: For components with factory-applied finishes.
- D. Samples for Verification: For each type of exposed finish required.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified professional engineer.
- B. Product Certificates: For each type of wood fence and gate, from manufacturer.
- C. Product Test Reports: For framing strength according to ASTM F 1043.
- D. Field quality-control reports.
- E. Warranty: Sample of special warranty.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For the care of wood fence materials.

#### 1.8 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of fencing from single source from single manufacturer.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of railings and are based on the specific system indicated. Refer to Section 01 60 00 "Product Requirements."
  - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

#### 1.9 PROJECT CONDITIONS

- A. Field Measurements: Verify layout information for wood fences shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

#### 1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of wood fences that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Deterioration of wood, metals, metal finishes, and other materials beyond normal weathering.
  - 2. Warranty Period: Five years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by a qualified and experienced installer, familiar with local codes, conditions, and materials.

### 2.2 WOOD COMPONENTS

- A. Slats: Western Red Cedar, clear. WCLB "A" Grade or equivalent. Dog-eared slat tops. 6'-0" height.
- B. Rails: Treated wood.

### 2.3 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.
  - 1. Provide cast-metal brackets with flange tapped for concealed anchorage to threaded hanger bolt.
  - 2. Provide either formed- or cast-metal brackets with predrilled hole for exposed bolt anchorage.
  - 3. Provide formed-steel brackets with predrilled hole for bolted anchorage and with snap-on cover that matches rail finish and conceals bracket base and bolt head.

### 2.4 METAL COMPONENTS

- A. Posts: ASTM F 1083 Schedule 40 hot-dipped galvanized steel pipe, welded construction, minimum yield strength 25 ksi. Pipe size per wind loading.
- B. Post Caps: Cast steel galvanized. Sized to post diameter. Set screw retainer.

### 2.5 HARDWARE AND FASTENERS

- A. General: Comply with ASTM A 153/A 153M.
- B. Hot-dipped galvanized or stainless steel.

### 2.6 GROUT AND ANCHORING CEMENT

- A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.
- B. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer, for exterior applications.

## 2.7 FABRICATION

- A. General: Fabricate wood fences to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Assemble wood fencing in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces. Spot galvanize all cuts and edges of metal posts, fasteners, and accessories.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate fences with bolted connections unless otherwise indicated.
- H. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
  - 1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.
- I. Close exposed ends of hollow fence and gate members with prefabricated end fittings.

## 2.8 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes of metal components.
- B. Protect mechanical finishes on exposed surfaces from damage until work completed.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Provide exposed fasteners with hot-dipped galvanized finish or stainless steel.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for a verified survey of property lines and legal boundaries, site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.

1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet (152.5 m) or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

### 3.3 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing fences. Set fences accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
3. Align fence rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (5 mm in 3 m).

C. Adjust fencing before anchoring to ensure matching alignment at abutting joints.

### 3.4 FENCING CONNECTIONS

A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting fencing components.

B. Welded Connections: Use fully welded joints for permanently connecting fencing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

C. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches (50 mm) beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches (150 mm) of post.

### 3.5 ANCHORING POSTS

A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.

B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
2. Provide protection of metals from contact with concrete.
3. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

- a. Exposed Concrete: Extend 2 inches (50 mm) above grade; shape and smooth to shed water.

### **3.6 ADJUSTING**

- A. Adjust wood fence planks for consistent height.
- B. Adjust fasteners in fence system for tight and secure condition.

### **3.7 CLEANING**

- A. Clean aluminum by washing thoroughly with clean water and soap, rinsing with clean water, and wiping dry.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

### **3.8 PROTECTION**

- A. Protect finishes of fences and gates from damage during construction period.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

**END OF SECTION 32 31 29**

## SECTION 32 92 00 - TURF AND GRASSES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Sodding.
  - 2. Erosion-control material(s).
- B. Related Requirements:
  - 1. Section 32 93 00 "Plants" for trees, shrubs, ground covers, and other plants as well as border edgings and mow strips.

#### 1.3 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- C. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- D. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- E. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

#### 1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project Site.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For landscape Installer.

- B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
  - 1. Certification of each seed mixture for turfgrass sod. Include identification of source and name and telephone number of supplier.
- C. Product Certificates: For fertilizers, from manufacturer.
- D. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

## 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of turf during a calendar year. Submit before expiration of required maintenance periods.

## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful turf establishment.
  - 1. Experience: Five years' experience in turf installation.
  - 2. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
  - 3. Pesticide Applicator: State licensed, commercial.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.
- B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" sections in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod within 24 hours of harvesting and in time for planting promptly. Protect sod from breakage and drying.
- C. Bulk Materials:
  - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
  - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
  - 3. Accompany each delivery of bulk materials with appropriate certificates.

## 1.9 FIELD CONDITIONS

- A. Planting Restrictions: Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion.

- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

## PART 2 - PRODUCTS

### 2.1 TURFGRASS SOD

- A. Turfgrass Sod: Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture that is strongly rooted and capable of vigorous growth and development when planted.
- B. Turfgrass Species: Bermudagrass (*Cynodon dactylon*).

### 2.2 FERTILIZERS

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
  1. Composition: 0.45 kg/92.9 sq. m (1 lb/1000 sq. ft.) of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
  2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

### 2.3 MULCHES

- A. Pine Straw Mulch: Provide air-dry, clean, mildew- and seed-free, pine straw mulch from local area.

### 2.4 PESTICIDES

- A. General: Pesticide, registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

### 2.5 EROSION-CONTROL MATERIALS

- A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 150 mm (6 inches) long.
- B. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.5 kg/sq. m (0.92 lb/sq. yd.), with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 150 mm (6 inches) long.

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.
  - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
  - 2. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
  - 3. Uniformly moisten excessively dry soil that is not workable or which is dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

**3.2 PREPARATION**

- A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
  - 1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
  - 2. Protect grade stakes set by others until directed to remove them.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

**3.3 TURF AREA PREPARATION**

- A. General: Prepare planting area for soil placement and mix planting soil.
- B. Placing Planting Soil: Place and mix planting soil in place over exposed subgrade.
  - 1. Reduce elevation of planting soil to allow for soil thickness of sod.
- C. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- D. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

**3.4 PREPARATION FOR EROSION-CONTROL MATERIALS**

- A. Prepare area as specified in "Turf Area Preparation" Article.
- B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.

- C. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.
- D. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

### 3.5 SODDING

- A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.
- B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to soil or sod during installation. Tamp and roll lightly to ensure contact with soil, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.
- C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 38 mm (1-1/2 inches) below sod.

### 3.6 TURF MAINTENANCE

- A. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and mulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
  - 1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
  - 2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
  - 3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.
- B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 100 mm (4 inches).
  - 1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
  - 2. Water turf with fine spray at a minimum rate of 25 mm (1 inch) per week unless rainfall precipitation is adequate.
- C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:
  - 1. Mow Bermudagrass to a height of 13 to 25 mm (1/2 to 1 inch).
- D. Turf Postfertilization: Apply commercial fertilizer after initial mowing and when grass is dry.

### 3.7 SATISFACTORY TURF

- A. Turf installations shall meet the following criteria as determined by Architect:

1. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.
- B. Use specified materials to reestablish turf that does not comply with requirements, and continue maintenance until turf is satisfactory.

### **3.8 PESTICIDE APPLICATION**

- A. Apply pesticides and other chemical products and biological control agents according to requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- B. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

### **3.9 CLEANUP AND PROTECTION**

- A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property.
- C. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.
- D. Remove nondegradable erosion-control measures after grass establishment period.

### **3.10 MAINTENANCE SERVICE**

- A. Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in "Turf Maintenance" Article. Begin maintenance immediately after each area is planted and continue until acceptable turf is established, but for not less than the following periods:
  1. Sodded Turf: 60 days from date of Substantial Completion.

**END OF SECTION 32 92 00**

## SECTION 32 93 00 - PLANTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Plants.
  - 2. Tree stabilization.
  - 3. Landscape edgings.
- B. Related Requirements:
  - 1. Section 32 92 00 "Turf and Grasses" for turf (lawn), mulch, and erosion-control materials.
  - 2. Reference drawings for landscape plan, materials, and general landscape notes.
  - 3. Reference drawings for planting irrigation system.

#### 1.3 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.
- C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.
- D. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than the minimum root spread according to ANSI Z60.1 for type and size of plant required.
- E. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
- F. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.
- G. Finish Grade: Elevation of finished surface of planting soil.

- H. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.
- I. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- J. Planting Area: Areas to be planted.
- K. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- L. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- M. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- N. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- O. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

#### 1.4 COORDINATION

- A. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.
  - 1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

#### 1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
  - 2. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 15 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

**1.7 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
- B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
  - 1. Manufacturer's certified analysis of standard products.
  - 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.
- D. Sample Warranty: For special warranty.

**1.8 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.

**1.9 QUALITY ASSURANCE**

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of plants.
  - 1. Experience: Five years' experience in landscape installation.
  - 2. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
  - 3. Pesticide Applicator: State licensed, commercial.
- B. Provide quality, size, genus, species, and variety of plants indicated on the drawings, complying with applicable requirements in ANSI Z60.1.
- C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
  - 1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 150 mm (6 inches) above the root flare for trees up to 100-mm (4-inch) caliper size, and 300 mm (12 inches) above the root flare for larger sizes.
  - 2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
- D. Plant Material Observation: Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
  - 1. Notify Architect of sources of planting materials seven days in advance of delivery to site.

### 1.10 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws if applicable.
- B. Bulk Materials:
  - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
  - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
  - 3. Accompany each delivery of bulk materials with appropriate certificates.
- C. Deliver bare-root stock plants within 24 hours of digging. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting. Transport in covered, temperature-controlled vehicles, and keep plants cool and protected from sun and wind at all times.
- D. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- E. Handle planting stock by root ball.
- F. Store bulbs, corms, and tubers in a dry place at 16 to 18 deg C (60 to 65 deg F) until planting.
- G. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.
  - 1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.
- H. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.
- I. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
  - 1. Heel-in bare-root stock. Soak roots that are in less than moist condition in water for two hours. Reject plants with dry roots.
  - 2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
  - 3. Do not remove container-grown stock from containers before time of planting.
  - 4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

### 1.11 FIELD CONDITIONS

- A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

- B. Planting Restrictions: Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
- C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

## 1.12 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.
    - b. Structural failures including plantings falling or blowing over.
    - c. Faulty performance of tree stabilization or edgings.
    - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 2. Warranty Period: 12 months from date of Substantial Completion.
  - 3. Include the following remedial actions as a minimum:
    - a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
    - b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
    - c. Provide extended warranty for period equal to original warranty period, for replaced plant material.

## PART 2 - PRODUCTS

### 2.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
  - 1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 19 mm (3/4 inch) in diameter; or with stem girdling roots are unacceptable.
  - 2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

- D. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant.
- E. If formal arrangements or consecutive order of plants is indicated on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.
- F. Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery.

## 2.2 FERTILIZERS

- A. Planting Tablets: Tightly compressed chip-type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.
  - 1. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

## 2.3 MULCHES

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
  - 1. Type: Pine straw.
  - 2. Mulch Thickness: As indicated on the drawings.
  - 3. Color: Natural.

## 2.4 WEED-CONTROL BARRIERS

- A. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 101g/sq. m (3 oz./sq. yd.) minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally encountered chemicals, alkalis, and acids.

## 2.5 PESTICIDES

- A. General: Pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

## 2.6 TREE-STABILIZATION MATERIALS

- A. Trunk-Stabilization Materials:

1. Upright and Guy Stakes: Of types recommended by provider of trees, installed as recommended for wind protection during entire warranty and maintenance period. Provide at least three per tree.
2. Guy Cables: Five-strand, 4.8-mm- (3/16-inch-) diameter, galvanized-steel cable, with zinc-coated turnbuckles, a minimum of 75 mm (3 inches) long, with two 10-mm (3/8-inch) galvanized eyebolts.
3. Flags: Standard surveyor's plastic flagging tape, white, 150 mm (6 inches) long.

B. Root-Ball Stabilization Materials:

1. Upright Stakes and Horizontal Hold-Down: Rough-sawn, sound, new hardwood or softwood, free of knots, holes, cross grain, and other defects, 38-by-38-mm actual (2-by-2-inch nominal) by length indicated; stakes pointed at one end.
2. Wood Screws: ASME B18.6.1.

## 2.7 LANDSCAPE EDGINGS

A. Steel Edging: Standard commercial-steel edging, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Border Concepts, Inc.
  - b. Collier Metal Specialties, Inc.
  - c. J. D. Russell Company (The).
  - d. Sure-loc Edging Corporation.
2. Edging Size: 4.8 mm (3/16 inch) thick by 100 mm (4 inches) deep.
3. Stakes: Tapered steel, a minimum of 300 mm (12 inches) long.
4. Accessories: Standard tapered ends, corners, and splicers.
5. Finish: Manufacturer's standard paint.
  - a. Paint Color: Green.

## 2.8 MISCELLANEOUS PRODUCTS

- A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.
- B. Burlap: Non-synthetic, biodegradable.
- C. Planter Drainage Gravel: Washed, sound crushed stone or gravel complying with ASTM D 448 for Size No. 8.
- D. Planter Filter Fabric: Nonwoven geotextile manufactured for separation applications and made of polypropylene, polyolefin, or polyester fibers or combination of them.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
  2. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.
  3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
  4. Uniformly moisten excessively dry soil that is not workable or which is dusty.
- B. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.
- D. Lay out plants at locations directed by Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

### 3.3 PLANTING AREA ESTABLISHMENT

- A. General: Prepare planting area for soil placement and mix planting soil.
- B. Placing Planting Soil: Place and mix planting soil in-place over exposed subgrade.
- C. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

### 3.4 EXCAVATION FOR TREES AND SHRUBS

- A. Planting Pits and Trenches: Excavate circular planting pits.
1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
  2. Excavate approximately three times as wide as ball diameter for stock.
  3. Excavate at least 300 mm (12 inches) wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
  4. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.

5. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
  6. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
  7. Maintain supervision of excavations during working hours.
  8. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
  9. If drain tile is indicated on Drawings or required under planting areas, excavate to top of porous backfill over tile.
- B. Backfill Soil: Subsoil and topsoil removed from excavations may be used as backfill soil unless otherwise indicated.
- C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
1. Hardpan Layer: Drill 150-mm- (6-inch-) diameter holes, 600 mm (24 inches) apart, into free-draining strata or to a depth of 3 m (10 feet), whichever is less, and backfill with free-draining material.
- D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.
- E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

### 3.5 TREE, SHRUB, AND VINE PLANTING

- A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.
- B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Balled and Potted and Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 25 mm (1 inch) above adjacent finish grades.
1. Backfill: Planting soil.
  2. Carefully remove root ball from container without damaging root ball or plant.
  3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
  4. Place planting tablets equally distributed around each planting pit when pit is approximately one-half filled. Place tablets beside the root ball about 25 mm (1 inch) from root tips; do not place tablets in bottom of the hole.
  5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

### 3.6 TREE, SHRUB, AND VINE PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.
- B. Prune, thin, and shape trees, shrubs, and vines as directed by Architect.

- C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.
- D. Do not apply pruning paint to wounds.

### 3.7 TREE STABILIZATION

- A. Trunk Stabilization by Upright Staking and Tying: Install trunk stabilization as follows unless otherwise indicated:
  - 1. Upright Staking and Tying: Stake trees of 50- through 125-mm (2- through 5-inch) caliper. Stake trees of less than 50-mm (2-inch) caliper only as required to prevent wind tip out. Retain one of two subparagraphs below.
  - 2. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
  - 3. Support trees with two strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
- B. Trunk Stabilization by Staking and Guying: Install trunk stabilization as follows unless otherwise indicated on Drawings. Stake and guy trees more than 4.2 m (14 feet) in height and more than 75 mm (3 inches) in caliper unless otherwise indicated.
  - 1. Site-Fabricated, Staking-and-Guying Method: Install no fewer than three guys spaced equally around tree.
    - a. Securely attach guys to stakes 760 mm (30 inches) long, driven to grade. Adjust spacing to avoid penetrating root balls or root masses. Provide turnbuckle for each guy wire and tighten securely.
    - b. For trees more than 150 mm (6 inches) in caliper, anchor guys to wood deadmen buried at least 900 mm (36 inches) below grade. Provide turnbuckle for each guy wire and tighten securely.
    - c. Support trees with bands of flexible ties at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.
    - d. Attach flags to each guy wire, 760 mm (30 inches) above finish grade.

### 3.8 PLACING SOIL IN PLANTERS

- A. Place a layer of drainage gravel at least 100 mm (4 inches) thick in bottom of planter. Cover bottom with filter fabric and wrap filter fabric 100 mm (4 inches) up on all sides. Duct tape along the entire top edge of the filter fabric, to secure the filter fabric against the sides during the soil-filling process.
- B. Fill planter with planting soil. Place soil in lightly compacted layers to an elevation of 38 mm (1-1/2 inches) below top of planter, allowing natural settlement.

### 3.9 GROUND COVER AND PLANT PLANTING

- A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on Drawings in even rows with triangular spacing.
- B. Use planting soil for backfill.
- C. Dig holes large enough to allow spreading of roots.
- D. For rooted cutting plants supplied in flats, plant each in a manner that minimally disturbs the root system but to a depth not less than two nodes.

- E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

### 3.10 PLANTING AREA MULCHING

- A. Install weed-control barriers before mulching according to manufacturer's written instructions. Completely cover area to be mulched, overlapping edges a minimum of 150 mm (6 inches) and secure seams with galvanized pins.
- B. Mulch backfilled surfaces of planting areas and other areas indicated.

### 3.11 EDGING INSTALLATION

- A. Steel Edging: Install steel edging where indicated according to manufacturer's written instructions. Anchor with steel stakes spaced approximately 760 mm (30 inches) apart, driven below top elevation of edging.

### 3.12 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.
- B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

### 3.13 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- B. Pre-Emergent Herbicides (Selective and Nonselective): Apply to tree, shrub, and ground-cover areas according to manufacturer's written recommendations. Do not apply to seeded areas.
- C. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

### 3.14 REPAIR AND REPLACEMENT

- A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Architect.

1. Submit details of proposed pruning and repairs.
  2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
  3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.
- B. Remove and replace trees, shrubs, and plants that are dead or in an unhealthy condition before the end of the maintenance period, or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.
1. Provide new trees, shrubs, and plants of same size and species as those being replaced.

### 3.15 CLEANING AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.
- C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- D. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.
- E. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

### 3.16 MAINTENANCE SERVICE

- A. Maintenance Service for Trees, Shrubs, and Ground Cover: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
1. Maintenance Period: 12 months from date of Substantial Completion.

END OF SECTION 32 93 00