

## SUFFOLK PUBLIC SCHOOLS



## SPS INNOVATION CENTER

## IFB #1871-B

RRMM Project No. 21222-21

## VOLUME 1 OF 1

PREPARED BY

RRMM ARCHITECTS ARCHITECTURE 
PLANNING 
INTERIORS CHESAPEAKE, VIRGINIA

SPEIGHT, MARSHALL, & FRANCIS, P.C. STRUCTURAL CONSULTANT VIRGINIA BEACH, VIRGINIA

THOMPSON CONSULTING ENGINEERS PLUMBING, MECHANICAL, ELECTRICAL CONSULTANT HAMPTON, VIRGINIA

January 22, 2024

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THIS DIVISION NOT USED

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THIS DIVISION NOT USED

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THIS DIVISION NOT USED

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THIS DIVISION NOT USED

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	HE CONTRACTOR AND AND CONT

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THIS DIVISION NOT USED

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#### PROJECT DIRECTORY

#### **OWNER:**

Suffolk Public Schools 1507 Freeney Street Suffolk, Virginia 23434 Owner's Representative:

Phone: (757) 898-0499

Terry Napier Director of Facilities & Planning

**ARCHITECT:** 

RRMM Architects 1317 Executive Boulevard, Suite 200 Chesapeake, Virginia 23320 Project Manager: Jeff Harris, Principal Architect Phone: (757) 213-6327 Fax: (757) 312-9996 E-Mail: jharris@rrmm.com

**STRUCTURAL ENGINEER:** Speight, Marshall, & Francis, P.C. 1228 Perimeter Parkway, Suite 201 Virginia Beach, VA 23454 Project Manager: Jonathan Walesczyk Phone: (757) 427-1020 Fax: (757) 671-8632

PLUMBING, MECHANICAL,	Thompson Consulting Engineers
ELECTRICAL ENGINEER:	22 Enterprise Parkway, Suite 200
	Hampton, Virginia 23666
	Project Manager: Celia Polman
	Phone: (757) 599-4415
	Fax: (757) 599-4113

END OF SECTION 000002

PROJECT DIRECTORY

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#### SECTION 000003 - SEALS PAGE

- 1.1 OWNER
  - A. Owner:
    - 1. Suffolk Public Schools
    - 2. 100 North Main Street, Suffolk, Virginia 23434

#### 1.2 DESIGN PROFESSIONALS OF RECORD

- B. Architect:
  - 1. RRMM Architects.
  - 2. Responsible for general Architectural Work and Divisions 01-14 Sections except where indicated as prepared by other design professionals of record.



- C. Structural Engineer:
  - 1. Speight Marshall Francis.
  - 2. Responsible for general Structural Work and in Division 01, 03, 05, Sections except where indicated as prepared by other design professionals of record.



- D. Plumbing and Mechanical Engineer:
  - 1. Thompson Consulting Engineers, Inc.
  - 2. Responsible for general Plumbing and Mechanical (HVAC) Work in Division 21 through 23 Sections except where indicated as prepared by other design professionals of record.



- E. Electrical Engineer:
  - 1. Thompson Consulting Engineers, Inc.
  - 2. Responsible for general Electrical, Communications and Security Systems Work and in Division 26 through 28 Sections except where indicated as prepared by other design professionals of record.



END OF SEALS PAGE

#### **INVITATION TO BID #1871-B**

Date: January 22, 2025

Owner: Suffolk City School Board User: Suffolk Public Schools Architect: RRMM Architects Project: SPS Innovation Center Suffolk Public Schools Bid #1871-B

Suffolk Public Schools is soliciting lump sum, sealed bids for the SPS Innovation Center. The project is located at 4169 Pruden Blvd., Suffolk, VA 23434. The scope of work consists of the conversion of an existing facility with the primary function of daycare to an administrative/office use. This change constitutes a change of occupancy from an "E" occupancy to a "B" occupancy, and includes the addition of new partitions, ceilings, interior finish upgrades, and associated plumbing, mechanical, and electrical modifications. Additionally, the building envelope will be modified where 2 existing roll up doors will be infilled with a combination of new exterior walls and glazing.

Bids may be submitted through the eVA portal or delivered in a sealed envelope or package clearly marked **"BID-1871-B SPS Innovation Center"**, including the due date and time. All bids shall be received in the Purchasing Office, on or before 2:00 PM., Thursday, February 13, 2025 and delivered to:

Linda Bates, NIGP-CPP, VCO, VCA Coordinator of Purchasing Suffolk Public Schools 100 North Main Street (entrance @ rear of building) Suffolk, Virginia 23434

Bids shall be publicly opened and read aloud at the above stated date, time and location. Any bid received after the time designated above will be returned unopened.

Any award resulting from this solicitation will be issued to the successful offeror in writing and will be posted on the Suffolk Public School Bid Board located at 100 North Main Street, Suffolk, Virginia 23434 and the Suffolk Public Schools website.

A non-mandatory Pre-Bid Conference will be held on Tuesday, January 28, 2025, at 3:30 p.m. at the project site. Bidders are encouraged to attend.

A bid bond is required. Procedures for submitting a bid, claiming an error, withdrawal of bids, and other pertinent information are contained in the contract documents. The procedure for withdrawal of bids shall be in accordance with the Instructions to Bidders and Section 2.2-4330, Code of Virginia. Bidders shall be required to comply with the provisions of Section 2.2-4311, Code of Virginia, in regard to nondiscrimination in employment. The owner reserves the right to reject any or all bids. This procurement is being conducted in compliance and under the laws found in the Virginia Public Procurement Act. Any mention of brand names is to denote the quality in which the public body is looking to obtain. Substitutions will be allowed with pre-authorization.

#### The last day to submit pre-bid questions shall be 5:00 PM on Tuesday February 4, 2025.

Questions, in writing, may be directed to: Jeff Harris of RRMM Architects at 1317 Executive Boulevard, Suite 200, Chesapeake, Virginia 23320, Phone (757) 622-2828, Email: <u>jharris@rrmm.com</u> with a copy to Linda Bates at lindabates@spsk12.net

Construction Documents, including Project Specifications and Drawings, will be available electronically for download beginning September 25, 2023, from: <u>eVA - Virginia's eProcurement</u> Marketplace

Bidder's attention is directed to the requirements of Title 54, Chapter 7, of the Code of Virginia pertaining to registration of Contractors. Suffolk Public Schools is an Equal Opportunity Employer

END OF INVITATION TO BID

#### SECTION 000213 - INSTRUCTIONS TO BIDDERS

#### 1. DRAWINGS AND SPECIFICATIONS:

Construction Documents, including Project Specifications and Drawings, will be available electronically for download beginning January 22, 2025 from: <u>eVA - Virginia's eProcurement</u> <u>Marketplace</u>. Should the specifications of conditions fail to exist in this document, the Code of Virginia shall dictate those terms.

#### 2. BIDS:

Before submitting a bid, each bidder shall carefully examine the drawings, specifications and other Contract Documents; read and understand the bidding documents and his bid; shall visit the site of the work; shall fully inform himself as to all existing conditions and limitations; and shall include in the bid the cost of all labor, supervision, items, materials, systems, and equipment described and included in the Contract Documents without exceptions.

#### 3. CONTRACT AND BONDS

Each bid shall be accompanied by a bid security in the form of a Bid Bond, a cashier's check, or a certified check in the amount of five percent (5%) of the total bid, made payable to the Suffolk City School Board. This Bid Bond, cashier's check, or certified check pledges that the bidder will enter into a Contract with the Owner on the terms stated in the Bid and will furnish bonds covering faithful performance of the Contract and payment of all obligations arising there under. Should the bidder refuse to enter into such a Contract or fail to furnish such bonds, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty.

Surety Bonds shall be written on AIA Document A310, Bid Bond, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

All bonds shall be written by sureties or insurance companies licensed to do business in the Commonwealth of Virginia. Other bid bond forms will be acceptable if in the same format as AIA Document A310, Bid Bond.

The Contract agreement will be on a form similar to that which is bound in the specifications. The completion date of construction shall be as indicated in the bid document. The successful bidder, simultaneously with the execution of the Contract agreement, shall be required to furnish a performance bond and a payment bond in an amount equal to one hundred percent (100%) of the Contract price, said bonds shall be secured from a surety company licensed to do business in the Commonwealth of Virginia and acceptable to the Suffolk City School Board.

#### 4. QUALIFICATION OF CONTRACTORS

Each bidder shall submit with the bid a completed Contractors Qualification Statement using AIA Document A305, 2020 Edition and associated Exhibits A-E (copies are included after the Supplementary General Conditions).

Bidders are required to submit with the bid evidence of proper and current certificates of contractors' registration in Virginia.

#### 5. LISTING OF SUBCONTRACTORS

The experience and responsibility of subcontractors may have bearing on the choice of a contractor by the Owner.

If required by the Owner, the apparent two low bidders for each project, shall deliver to the Owner within seventy-two (72) hours (not including Saturday, Sunday or State Holidays) for review the following information:

- a. Provide a list of the work to be performed by the bidder with his own forces.
- b. Provide the proprietary names and the suppliers of the principal parts (items, systems, materials, and equipment) proposed for the work.
- c. Provide a list of the names of the subcontractors to be employed for each of the principal parts of the work, copies of their agreements, and their corresponding dollar amounts.
- d. Provide a list of references and/or past projects for individual subcontractors performing a principal part of the work. This requirement applies to subcontractors at any tier.

Principal part shall mean a subcontract dollar value in excess of \$10,000.00.

The bidder will be required to establish the reliability and responsibility of the proposed subcontractors, manufactures, and suppliers who shall furnish and perform the work described in the specifications to the satisfaction of the Architect and the Owner.

These lists shall be binding upon the Contractor; however, the Owner has the right to reject any or all subcontractors which the Architect and the Owner determines to be unqualified to do the work. Owner may withhold awarding a contract to any particular bidder if the Owner considers one or more of the proposed contractors to be unqualified.

#### 6. INTERPRETATIONS OF PLANS AND SPECIFICATIONS

If any person contemplating the submission of a bid for the proposed Contract is in doubt as to the true meaning of any part of the drawings, specifications or other proposed contract documents, he/she may submit a written request to RRMM Architects, Attention: Jeff Harris, 1317 Executive Blvd, Suite 200, Chesapeake, VA, 23320; telephone number (757) 213-6327. The request must be submitted on the project Pre-Bid question form and e-mailed to all of the addresses indicated on the form. The Pre-Bid Question Form is included after the Supplementary General Conditions for use by bidders when submitting questions. Questions submitted in any other format will not receive a response. Requests must be in writing and received no later than seven (7) working days prior to the date of the bid opening, for an interpretation thereof. The person submitting the request will be responsible for its prompt delivery. Any interpretation of the proposed documents will be made only by addendum. The Owner and the Architect will not be responsible for any other explanations or interpretations of the proposed documents.

#### 7. ADDENDA OR BULLETINS

Addenda or bulletins will be issued on the eVA - Virginia's eProcurement Marketplace. Any addendum or bulletin issued during the time of bidding shall become part of the documents provided to the bidders for the preparation of the bid, shall be covered in the bid, and shall be made a part of the Contract. No addenda will be issued later than four (4) days prior to the date for receipt

of bids except an addendum, if necessary, postponing the date for receipt of bids or withdrawing the request for bids. Awards shall be posted at the school division's office and on the school division website.

#### 8. RIGHT TO NEGOTIATE

The Owner reserves the right to negotiate with the lowest responsive and responsible Bidder(s) to obtain a Contract price with funds available to the Owner whenever such low bid exceeds the Owner's availability of funds for the work.

#### 9. AWARD OF CONTRACT

The Owner intends to award this contract in writing to the lowest responsive and responsible bidder(s) provided the bids have been submitted in accordance with the requirements of the bid and contract documents, Virginia procurement regulations, is judged to be reasonable, and does not exceed the funds available. The Notice of Award(s) will be posted on the Suffolk Public Schools Bid Board, located on the second floor of the School Board office, 100 North Main Street, Suffolk, VA 23434 and on the Suffolk Public Schools website.

The Owner reserves the right to award the project based on the lowest responsible Base Bid received and any combination of alternates thereof and, that the Owner determines to be in the best interest of the Owner.

The Owner reserves the right to waive any informality in any bid or in the bidding. The accepted bidder(s) shall assist and cooperate with the Owner in preparing a formal Contract Agreement and within five (5) days following its presentation shall sign and deliver four (4) complete sets of Contract Agreement documents to the Owner, including but not limited to: the Agreement, the Performance Bond, Payment Bond, Hold Harmless Agreement, and all necessary Certificates of Insurance.

The successful bidder(s), upon failure or refusal to enter in the Contract and/or to furnish the required Performance Bond, Payment Bond, and other required documents within the time specified, shall pay to the Owner as liquidated damages, an amount equal to the bid guarantee deposited with the bid or a portion thereof equal to the difference between the bid security and the next highest acceptable bid.

#### 10. TIME IS OF THE ESSENCE

Time is of the essence for this Contract.

#### 11. RESPONSIBLE BIDDER

The Owner reserves the right to award each individual school project based on the lowest responsible Base Bid received or any combination thereof and, that the Owner determines to be in the best interest of the Owner. In determining the "lowest responsible bidder(s)" Suffolk Public Schools may consider the following:

- a. Past performances of the contractor and subcontractors that indicate their ability to complete this project (includes organization, equipment available and any other indicators).
- b. Whether the bidder can perform the contract or provide the service promptly, or within the time specified, without delay.
- c. Quality of products used and adherence to bid specifications.

- d. The sufficiency of financial resources and the ability of bidder to perform the contract.
- e. The previous and existing compliance by the bidder with laws and ordinances.
- f. The quality of performance of previous contracts or services.

In addition, the Owner reserves the right to reject any or all bids or to negotiate with the low bidder(s) in the case of insufficient funds.

#### 12. COST BREAKDOWN

The Contractor shall, before starting his work, submit to the Owner and Architect the cost of various segments of the work according to construction activity, the total amount equaling the Contract price. This breakdown shall be used as the basis for the payment of estimates as stated in the Contract Documents.

#### 13. RIGHT TO REJECT BIDS

The Owner reserves the right to reject any or all bids, in whole or in part; to waive informalities; and/or to delete items prior to making an award; whenever it may be deemed by the Owner to be in their best interest.

#### 14. BID BOND OR CHECKS OF SUCCESSFUL BIDDERS

Bid Bond or Checks submitted by the successful bidder will be returned upon acceptance of the 100% performance bond and separate 100% payment bond. Checks from other bidders, not previously forfeited, will be returned as soon as it is determined that the bids represented by the checks will receive no further consideration by the Owner.

#### 15. REVSIONS TO BID

Handwritten or typed notes on the envelope containing the bid will not be accepted as authorized modifications to the Bid Form included herein. The bid amount indicated on the Bid Form will be the only data considered.

#### 16. WITHDRAWAL OF BIDS

Bids may be withdrawn by written or telegraphic request received from bidders prior to the time fixed for the bid opening. Telegraphic requests must be received by the Owner in written form before the bid opening. Negligence on the part of the bidder in preparing the bid confers no right for the withdrawal of the bid after it has been opened except as permitted in Section 2.2-4330 of the Code of Virginia as outlined below.

A bidder may withdraw his bid from consideration if the price bid was substantially lower than the other bids due solely to a mistake in the bid, provided the bid was submitted in good faith, and the mistake was a clerical mistake as opposed to a judgment mistake, and was actually due to an unintentional arithmetic error or an unintentional omission of a quantity of work, labor or material made directly in the compilation of a bid, whereby the unintentional arithmetic error or unintentional omission can be clearly shown by objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the bid sought to be withdrawn.

The bidder must give notice in writing of his claim of right to withdraw his bid within two (2) business days after the conclusion of the bid opening procedure. This notice to the Owner must be

accompanied with his original work papers, documents, and materials used in the preparation of the bid. Such work papers shall be delivered to the Owner by the bidder in person or by registered mail.

Such mistake shall be proved only from the original work papers, documents, and materials delivered to the Owner as required herein.

Failure of bidder to submit his original work papers, documents, and materials used in the preparations of this bid at the time, date and place required, shall constitute a waiver of bidders' right to claim a mistake in his bid.

No bid shall be withdrawn under this section when the result would be the awarding of the Contract on another bid of the same bidder.

No bidder who is permitted to withdraw a bid shall for compensation, supply any material or labor to or perform any subcontract or other work agreement for the person or firm to whom the Contract is awarded or otherwise benefit directly or indirectly from the performance of the Project for which the withdrawn bid was submitted.

If the bid is withdrawn under authority of this section, the next lowest responsive and responsible bidder shall be deemed to be the low bidder on the Project.

When the procedure set forth in the paragraphs above is utilized, original work papers, documents, and materials used in the preparation of the bid must be submitted in an envelope or package separate and apart from the envelope containing the bid marked clearly as to the contents.

#### END OF INSTRUCTIONS TO BIDDERS

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#### **IFB-1871-B, SPS INNOVATION CENTER**

#### **BID FORM**

This bid is for the SPS Innovation Center for Suffolk Public Schools, Suffolk, VA

Each bidder shall submit their bid on this form. Submit two (2) copies of this form completed and with original signatures.

To: Linda Bates Coordinator of Purchasing Suffolk Public Schools 100 North Main Street Suffolk, Virginia 23434

From:

(Name)

(Address)

Having carefully examined the bid documents including the Invitation to Bid, Instructions to Bidders, Specifications, Drawings, Terms of Agreement and Addenda (if any) prepared by the architect, entitled:

#### SPS Innovation Center for Suffolk Public Schools, Suffolk, VA

as well as the premises and conditions affecting the work, the undersigned proposes to furnish all labor, supervision, materials, equipment, and services necessary to perform all the work in accordance with the contract documents for the following lump sum amount.

The Owner will consider any request made by the Contractor to extend the Contractor's time for performance of the work and may grant reasonable time extensions when delays in the Contractor's work performance are directly caused by supply chain delays, if the Contractor has provided the Owner with (i) reasonable notice in advance that its work is being impacted by supply chain delays; (ii) adequate verification to support the Contractor's claim; and (iii) written certification that any delay in its performance of this Contract is beyond the Contractor's control and not the result of actions or any failure to act by the Contractor.

#### BASE BID

The Lump Sum Base Bid price for the entire work in this package, including any allowances and unit prices, completed within the time limits and in accordance with the contract documents is:

Dollars

(Words) (\$\_\_\_\_\_). (Figures)

ADDITIVE BID ALTERNATES:

**Bid Alternate No. 1:** Includes the removal and replacement of the (2) existing rooftop mechanical units and (2) exhaust fans with 1 new rooftop unit and new exhaust fans. This scope includes all associated ductwork, Variable Air Volume (VAV) boxes, controls, ceilings, structural reinforcement, and all associated electrical, plumbing, and mechanical modifications. Additionally the alternate includes the removal of existing, non load bearing, CMU wall partitions at the existing Break Room and Locker Rooms to accommodate a larger break area and work room with associated new floor, wall, and ceiling finishes, light fixtures, and ductwork.

	Dollars
(Words)	

(\$\_\_\_\_\_).

#### **ADDENDA:**

The above stated bid is based on the Contract Documents and the following additional addenda issued subsequent to the release of the drawings and specifications for bids. (List all addenda with dates, if issued. If no addenda are issued, write the word "none".)

Addenda #	Date	Addenda #	Date
Addenda #	Date	Addenda #	Date

#### TIME OF COMPLETION:

Work at the site(s) shall commence within ten (10) working days following the execution of the contract or the Notice-To-Proceed. The Owner anticipates the Award of these contract(s) or the issuance of the Notice-Of-Award on or before November 9, 2023. The work shall be completed in a single phase of work for the project. All work shall be substantially complete and finally complete as follows: Substantial Completion July 01, 2025

July 15, 2025

Substantial Completion 100% Final Completion

The Owner will consider any request made by the Contractor to extend the Contractor's time for performance of the work and may grant time reasonable time extensions when delays in the Contractor's work performance are directly caused by supply chain delays, if the Contractor has provided the Owner with (i) reasonable notice in advance that its work is being impacted by supply chain delays; (ii) adequate verification to support the Contractor's claim; and (iii) written certification that any delay in its performance of this Contract is beyond the Contractor's control and not the result of actions or any failure to act by the Contractor.

#### PROFIT AND OVERHEAD FOR CHANGE ORDERS:

Change Orders initiated per Article 9 of the General Conditions shall be executed on the basis of the cost of the work, plus a percentage of the work, according to the percentages indicated in Articles 9.3.4.2.1 and 9.3.4.2.2 of the General Conditions.

#### **OTHER:**

If notified of the acceptance of this bid(s), the undersigned agrees to execute and deliver to the owner the Contract and Contractor's Bonds within ten (10) calendar days from the date of notification and, to faithfully and properly complete the work with the best interest of the Owner, the safety of the public, and in accordance with first class workmanship.

The undersigned agrees that the Owner may retain five percent (5%) of the Contract amount as specified in the **Sample Agreement/Agreement**.

#### **BID SECURITY:**

Attached hereto is a cashiers check, certified check, or Bid Bond (AIA Document A310 or from a Surety Company authorized to do business in the Commonwealth of Virginia and acceptable to the Owner), none of which shall be less than five percent (5%) of the principle bid amount, and made payable to Suffolk City School Board.

The undersigned agrees, if awarded the Contract, to comply with all provisions regarding commencement, performance, completion, and acceptance of the work described in the abovementioned specifications and drawings, construction contract, and as stipulated in this proposal. The undersigned further agrees, if awarded this contract, to execute and deliver Performance and Labor and Material Payment bonds each in an amount equal to one hundred percent (100%) of the Contract Price. In case of bidders failure to execute the Contract, provide a performance bond, or to commence the work, the check or bid bond shall be paid as liquidated damages for such failure; otherwise the check or bid bond accompanying the proposal will be returned to the Undersigned.

#### LIQUIDATED DAMAGES:

The Bidder acknowledges and agrees to the liquidated damages specified in the **Sample Agreement/Agreement**. Bidder also acknowledges that time is of the essence and that work to be performed by others and/or use of the school is restrained by the timely completion of the work within this contract.

The Owner will consider any request made by the Contractor to extend the Contractor's time for performance of the work and may grant time reasonable time extensions when delays in the Contractor's work performance are directly caused by supply chain delays, if the Contractor has provided the Owner with (i) reasonable notice in advance that its work is being impacted by supply chain delays; (ii) adequate verification to support the Contractor's claim; and (iii) written certification that any delay in its performance of this Contract is beyond the Contractor's control and not the result of actions or any failure to act by the Contractor.

#### **BID FORM SIGNATURE(S):**

The Undersigned declares that this firm is (check one):

- □ A Corporation organized and existing under the laws of .
- □ A Partnership consisting of
- □ A sole Proprietorship.
- □ Other

Virginia State Corporation Commission ID #

It is agreed, that the Undersigned has complied with and/or will comply with all requirements concerning licensing and with all other Local, State, and National laws and that no legal requirement

has been, or will be, violated in making or accepting this proposal, in awarding the contract to him, and/or in the prosecution of the work required therein.

The Undersigned declares that the person, or persons, signing this proposal is/are fully authorized to sign the proposal on behalf of the firm listed and to fully bind their firm listed to all the conditions and provisions thereof. It is agreed that no person, persons, or company other that the firm listed below or as otherwise indicated hereinafter has any interest whatsoever in this proposal of the Contract that may be entered into as a result thereof and that in all respects the proposal is legal, fair, and submitted in good faith without collusion or fraud.

Respectfully submitted this day of	, 2025.
(Name of Firm)	
(Address)	Affix Seal
Telephone ()         Fax ()	
Email address	
Registered Virginia Contractor #:	( Please attach a copy of the registration)
By: (Signature)	
Name:	
Title:	Affix Seal
(Printed)	



### **Bid Bond**

#### **CONTRACTOR:**

(Name, legal status and address)

#### SURETY:

(Name, legal status and principal place of business)

#### **OWNER:**

Init.

1

(Name, legal status and address) Suffolk Public Schools 100 N. Main Street Suffolk, Virginia 23434

#### **BOND AMOUNT: \$**

PROJECT: (Name, location or address, and Project number, if any) SPS Innovation Center

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

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Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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Signed and sealed this day of .

1

	(Contractor as Principal)	(Seal)
(Witness)	(Title)	
	(Surety)	(Seal)
(Witness)	(Title)	

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AIA<sup>®</sup> Document A310<sup>™</sup> – 2010

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

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PAGE 1

Suffolk Public Schools 100 N. Main Street Suffolk, Virginia 23434

•••

SPS Innovation Center

## **Certification of Document's Authenticity**

AIA<sup>®</sup> Document D401<sup>™</sup> – 2003

I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 14:03:50 ET on 11/19/2024 under Order No. 4104243226 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA<sup>®</sup> Document A310<sup>™</sup> - 2010, Bid Bond, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

(Title)

(Dated)

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#### Sample Agreement

#### Suffolk City School Board IFB # -1871-B

THIS AGREEMENT, made and entered into this \_\_\_\_\_\_ day of \_\_\_\_\_, 2025 by and between the Suffolk City School Board, (hereinafter called the Owner), whose address is 100 N Main Street, Suffolk, VA 23434 and \_\_\_\_\_\_ (hereinafter called the Contractor), whose address is \_\_\_\_\_\_.

WITNESSETH: WHEREAS, the Owner intends to contract the construction of Lakeland High School Auditorium Renovation. The project is located at 4169 Pruden Blvd., Suffolk, VA 23434

WHEREAS, the Contractor agrees to perform the work for the sum herein stated.

NOW THEREFORE, the Owner and the Contractor agree as set forth below.

#### ARTICLE 1. SCOPE OF WORK

The work to be performed shall be in accordance with IFB # - 1871-B and all related Contract Documents prepared by RRMM Architects dated January 9, 2025, and entitled **"SPS Innovation Center"**. The Contractor agrees to furnish all labor, materials, equipment and supervision to complete the work as required in the Contract Documents, which are hereby made a part of this contract by reference. It is understood and agreed by the parties hereto that all work shall be performed as required in IFB # - 1871-B and related Contract Documents and shall be subject to inspection and approval by the Owner or its authorized representative. The relationship of the Contractor to the Owner hereunder is that of an independent Contractor. The Contract Documents are defined in the General Conditions and are incorporated herein by reference.

#### **ARTICLE 2. TIME OF COMPLETION**

The Contractor shall commence the work promptly upon the date established in the Notice of Award or Notice to Proceed. The Contractor shall achieve all the times and dates shown on the bid form, which are incorporated herein by reference and made a part of this Contract as though fully set forth herein. All work shall be completed as follows:

Substantial Completion	July 01, 2025
100% Final Completion	June 15, 2025

#### ARTICLE 3. CONTRACT SUM

The	Owner agrees to pay, and the Contr	actor agrees to accept in full performa	ance of this Contract, the
sum	of	, (\$	) which
sum	also includes:		

- A) The cost of a 100% Performance Bond and a 100% Payment Bond, said bonds having been posted by the Contractor pursuant to laws of the Commonwealth of Virginia;
- B) All work included in bid Addenda Number(s) \_\_\_\_\_\_.

C) All Deductive and Additive Bid Alternates accepted by the Owner, which include #'s:

#### **ARTICLE 4. PAYMENT**

The Owner agrees to pay the Contractor as the work progresses, but not more frequently than once each month after the date of the Notice of Award or Notice to Proceed, and only after fully complying with the General Conditions and completion of an acceptable Certificate of Payment for the work performed during the preceding calendar month, ninety-five percent (95%) of the value of the labor performed and, subject to the requirements of the General Conditions, ninety-five percent (95%) of the value of materials furnished in place or on-site.

The Contractor shall supply such evidence of labor performed and materials furnished, as the Owner may desire, at time of request for the Certificate of Payment of account. Materials for which payment has been made cannot be removed from job site.

Retainage Reduction – Five percent (5%) of the earned amount shall be retained from each monthly payment until fifty percent (50%) of the dollar amount of the Contract has been earned. During the last fifty percent (50%) of the Contract, retainage may be reduced pursuant to applicable provisions of the General Conditions.

A payment clause that obligates a contractor on a construction contract to be liable for the entire amount owed to any subcontractor with which it contracts. Such contractor shall not be liable for amounts otherwise reducible due to the subcontractor's noncompliance with the terms of the contract. However, in the event that the contractor withholds all or a part of the amount promised to the subcontractor under the contract, the contractor shall notify the subcontractor, in writing, of his intention to withhold all or a part of the subcontractor's payment with the reason for nonpayment. Payment by the party contracting with the contractor shall not be a condition precedent to payment to any lower-tier subcontractor, regardless of that contractor receiving payment for amounts owed to that contractor. Any provision in a contract contrary to this section shall be unenforceable.

#### ARTICLE 5. INDEBTEDNESS

Before final payment is made, the Contractor must submit evidence in the form of a final waiver of lien or claim to the Owner that all payrolls, materials bills, subcontracts and outstanding indebtedness in connection with the work have been paid or what arrangements have been made for their payment.

Payment will be made without unnecessary delay and after receipt of such evidence as mentioned above and final acceptance of the work by the Owner.

#### ARTICLE 6. ADDITIONAL WORK

It is understood and agreed by the parties hereto that no money will be paid to the Contractor for any additional labor or materials furnished unless a new contract in writing or a modification hereto for such additional materials or labor has been executed by the Owner and Contractor. The Owner specifically reserves the right to modify or amend this Contract and the total sum due hereunder either by enlarging or restricting the scope of work.

#### ARTICLE 7. ACCEPTANCE

The work shall be inspected for acceptance by the Architect promptly upon receipt of notice from the Contractor that the work is complete and ready for inspection.

#### ARTICLE 8. DISPUTES PERTAINING TO PAYMENT FOR WORK

Should disputes arise regarding the value of any work done, or any work omitted, or of any extra work which said Contractor may be required to perform, or respecting any other elements involved in this Contract, said dispute shall be brought to the attention of the Program Manager who will endeavor to settle matters. If he/she is unsuccessful, the dispute will be brought to the attention of the Suffolk City School Board and their decision shall be final and conclusive.

#### ARTICLE 9. TERMINATION FOR BREACH, ETC.

If the Contractor shall be adjudged bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he or any of his subcontractors violate any of the provisions of this Contract, the Owner may serve written notice upon him of its intention to terminate said Contract; and unless, within ten (10) days after the serving of such notice, such violation shall cease, the Owner then may take over the work and prosecute same to completion by contract or by any other method it may deem advisable for the account and at the expense of the Contractor. The Owner may take possession of and utilize in completing the work, such materials, equipment, and any other property belonging to the Contractor as may be on the site of the work and necessary therefore. The Owner may, at any time upon ten (10) days written notice to the Contractor, terminate (without prejudice to any right or remedy of the Owner) the whole or any portion of the work for the convenience of the Owner.

## ARTICLE 10. OWNER'S RIGHT TO WITHHOLD CERTAIN AMOUNT AND MAKE APPLICATION THEREOF

The Owner may withhold from payment to the Contractor such an amount or amounts as, in the Owner's sole judgment, may be necessary to pay just claims against the Contractor or any subcontractor for labor and services rendered and materials furnished in and about the work. The Owner may apply such withheld amounts on the payment of such claims in its sole discretion. In so doing, the Owner shall be deemed the agent of the Contractor and payments so made by the Owner shall be made by the Owner under the terms of the Contract and in good faith and no liability whatsoever shall attach to the Owner for having made such payments. Such payments may be made without prior determination by the Owner of the validity of any claim or claims.

#### ARTICLE 11. LIABILITY AND INDEMNIFICATION

The Contractor agrees that it shall at all times protect and indemnify and save harmless, the Suffolk City School Board and all institutions, agencies, departments, authorities and instrumentalities of the School Board and any member of the School Board or of their boards or commissions or any of the elected or appointed officers or any of their employees or authorized volunteers as described in the General Conditions of the project specifications which are included herein by reference, from any and all claims, damages of every kind and nature made, rendered or incurred by or in behalf of any person or corporation whatsoever, including the parties hereto and their employees that may arise, that occur

or grow out of any acts, actions, work or other activity done by the said Contractor in the performance and execution of this Contract.

#### **ARTICILE 12. SUBCONTRACTOR**

No part of this Contract shall be sublet by the Contractor without prior written approval of the Owner.

#### ARTICLE 13. LIQUIDATED DAMAGES

Should the Contractor fail to Finally Complete the work on or before the Contract Completion Date for any and all completion dates, referred to in Article 2 hereof, the Contractor shall pay to the Owner the sum of \$500.00 for each consecutive calendar day that terms of the Contract remain unfulfilled as defined in Article 9, Section 9.11 of the Supplementary General Conditions of the Construction Contract.

The Owner will consider any request made by the Contractor to extend the Contractor's time for performance of the work and may grant time reasonable time extensions when delays in the Contractor's work performance are directly caused by supply chain delays, if the Contractor has provided the Owner with (i) reasonable notice in advance that its work is being impacted by supply chain delays; (ii) adequate verification to support the Contractor's claim; and (iii) written certification that any delay in its performance of this Contract is beyond the Contractor's control and not the result of actions or any failure to act by the Contractor.

#### ARTICLE 14, NONDISCRIMINATION

During the performance of this contract, the contractor agrees as follows:

- a. The contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
- b. The contractor, in all solicitations or advertisements for employees placed by or on behalf of the contractor, will state that such contractor is an equal opportunity employer.
- c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

The contractor will include the provisions of the foregoing paragraphs a, b and c in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.

Suffolk Public Schools does not discriminate against faith-based organizations.

#### ARTICLE 15, DRUG FREE WORKPLACE

SAMPLE AGREEMENT

During the performance of this contract, the contractor agrees to:

- a. Provide a drug-free workplace for the contractor's employees,
- b. Post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession or use of a controlled substance or marijuana is prohibited in the contractor's work place and specifying the actions that will be taken against employees for violations of such prohibition,
- c. State in all solicitations or advertisements for employees placed by or on behalf of the contractor that the contractor maintains a drug-free work place,
- d. Include the provisions of the foregoing clauses in every subcontract or purchase order of over \$10, 000 so that the provisions will be binding upon each subcontractor or vendor.

#### ARTICLE 16, CONTRACTOR/EMPLOYEE BACKGROUND CERTIFICATION

Upon award, the contractor and any employee who will have direct contact with students shall provide certification that (i) he has not been convicted of a felony or any offense involving the sexual molestation or physical or sexual abuse or rape of a child; and (ii) whether he has been convicted of a crime of moral turpitude.

Any person making a materially false statement regarding such offense shall be guilty of a Class 1 misdemeanor and, upon conviction, the fact of such conviction shall be grounds for the revocation of the contract to provide such services and, when relevant, the revocation of any license required to provide such services.

#### ARTICLE 17, STATE CORPORATION COMMISSION ID NUMBER

In accordance with new registration requirements effective July 1, 2010, the Contractor shall include the identification number issued by the State Corporation Commission as proof of registration or justification for non-registration per the requirements in Section 13.1 or Title 50 of the Code of Virginia. **SCC ID #**\_\_\_\_\_

#### ARTICLE 18, COMPLIANCE WITH FEDERAL IMMIGRATION LAW

The Contractor shall not, during the performance of a contract knowingly employ an unauthorized alien as defined in the Federal Immigration Reform and Control Act of 1986.

#### SIGNATURE PAGES

**IN WITNESS WHEREOF**, the parties have caused the Agreement to be executed by the following duly authorized officials.

SUFFOLK CITY SCHOOL BOARD,

A Body Corporation

By:

Chair Suffolk City School Board

By:

Superintendent Suffolk City Public Schools

#### **NOTARY CLAUSE**

Commonwealth of Virginia				
City/County			, to wit: The following	instrument was
Acknowledged before me this	day of		, 2025 by	
				Name
	,			, and
Name			Title	
Nomo	,		Title	·
Iname			The	
My commission expires:				
Notary Number:				
			Notary Public	
		Contra	ctor	
		By:		
			Signature	
			Print Name	
			Title	
ADDROVED AS TO FORM AND CONT				

APPROVED AS TO FORM AND CONTENT:

**RRMM PROJECT NO. 21222-21** 

School Board Attorney

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# AIA Document A201° – 2007

## General Conditions of the Contract for Construction

#### for the following PROJECT:

(Name and location or address) SPS Innovation Center

#### THE OWNER:

(Name, legal status and address) Suffolk Public Schools 100 N. Main Street Suffolk, Virginia 23434

#### THE ARCHITECT:

(Name, legal status and address) **RRMM** Architects 1317 Executive Boulevard, Suite 200 Chesapeake, Virginia 23320

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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.

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§ 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

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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

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

§ 3.4.2 Except in the case of minor changes in the Work 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

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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
- Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly .3 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

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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

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§ 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

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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.

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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.

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§ 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

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

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# § 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:

- The change in the Work; .1
- .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:

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

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§ 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:

- Costs of labor, including social security, old age and unemployment insurance, fringe benefits required .1 by agreement or custom, and workers' compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed:
- Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor .3 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.

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# § 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

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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

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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;

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- .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

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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.

§ 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

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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

- liens, Claims, security interests or encumbrances arising out of the Contract and unsettled; .1
- failure of the Work to comply with the requirements of the Contract Documents; or .2
- .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

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

- employees on the Work and other persons who may be affected thereby; .1
- the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, .2 under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, .3 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

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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.

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§ 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.

# § 10.4 EMERGENCIES

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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.

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

# § 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:

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

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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,

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§ 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.

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§ 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

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# § 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

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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.

#### **MISCELLANEOUS PROVISIONS** ARTICLE 13

## § 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.

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§ 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.

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# § 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- repeatedly refuses or fails to supply enough properly skilled workers or proper materials; .1
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful .3 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;
- Accept assignment of subcontracts pursuant to Section 5.4; and .2
- .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

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

# § 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;
- .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.

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# 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

- damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, .1 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.

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§ 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.

Init. ł

§ 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.

# Additions and Deletions Report for

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

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

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## PAGE 1

SPS Innovation Center

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Suffolk Public Schools 100 N. Main Street Suffolk, Virginia 23434

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(Name, legal status and address) **RRMM** Architects 1317 Executive Boulevard, Suite 200 Chesapeake, Virginia 23320

# **Certification of Document's Authenticity**

AIA<sup>®</sup> Document D401<sup>™</sup> – 2003

I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 14:03:26 ET on 11/19/2024 under Order No. 4104243226 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA<sup>\*</sup> Document A201<sup>TM</sup> – 2007, General Conditions of the Contract for Construction, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

(Title)

(Dated)

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#### SECTION 000800 - SUPPLEMENTAL CONDITIONS

The following Supplemental Conditions modify the "General Conditions of the Contract for Construction", AIA Document A201, Fifteenth Edition, 2007. Where a portion of the General Conditions is modified or deleted by these Supplemental Conditions, the unaltered portions of the General Conditions shall remain in full force and effect.

#### ARTICLE 1; GENERAL PROVISIONS

#### 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

Add to 1.2 the following Clause 1.2.3.1:

1.2.3.1 Where on any drawings a portion of the Work is drawn out and the remainder is indicated in outline, the parts drawn out shall apply also to all other work. Where details or conditions are indicated but started only, such details, or conditions shall be continued throughout the course or parts in which they occur and shall also apply to all other similar parts of the Work unless otherwise indicated or specifically noted. On all Drawings, figures shall take precedence over measurements by scale, and scaling is done at the Contractor's own risk.

ARTICLE 2; OWNER

#### 2.1. GENERAL

Delete Subparagraph 2.1.2 in its entirety.

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

Delete Subparagraph 2.2.1 in its entirety.

Delete subparagraph 2.2.5 in its entirety and substitute the following:

2.2.5 The Contractor will be furnished, an electronic (PDF) copy of the drawings and specifications. Additional hard copy sets will be furnished at the cost of reproduction, postage and handling.

#### 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

2.4.1 Delete the sentence in Subparagraph 2.4.1 reading "Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect."3.10 CONTRACTOR'S CONSTRUCTION SCHEDULESAdd the following subparagraph 3.10.4:

3.10.4 Contract time adjustments for abnormal inclement weather will be based upon the following requirements:

3.10.4.1 Contractor agrees that Dates under this Contract will not be extended due to normal inclement weather. For a time extension to be granted for abnormal inclement weather: (1) such weather must, in the judgment of the Architect, actually have an adverse effect upon the progress of the Contractor's work which is of a critical nature; and (2) in the judgment of the Architect, the adverse effect must not be due to any fault or negligence of Contractor and could not have been avoided by Contractor through proper planning, coordination, and implementation of adequate weather protection necessary to allow the Work to be continued. Contractor agrees that the fact that abnormal inclement weather may occur, does not, of itself, justify any time extension hereunder.

3.10.4.2 Contractor agrees that it shall not be entitled to a time extension for normal inclement weather which can be expected at the Project locale due to precipitation, based on actual data from the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) for the locale of the Project. Contractor acknowledges and warrants that in making its bid and Construction Schedule for the Work, it gave due care and consideration to this expected number of work days of inclement weather for the locale of the Project and allowed therefore the impact of inclement weather on subsequent work. During the time of performance, should the expected number of work days of inclement weather for the locale of the Project be less than originally anticipated by Contractor and Owner, at the time of contracting, those days not so affected by inclement weather shall be considered float time.

January	8	July	4
February	8	August	4
March	8	September	4
April	6	October	4
May	4	November	4
June	4	December	6

3.10.4.3 Time extensions for weather delays during a given month will be allowed only for actual work days lost in excess of the anticipated number of work days lost (listed above) and only when those excess lost days adversely impact the current critical path(s) leading to the specified Substantial Completion or Contract Completion dates. Actual work days lost are defined as days that work was prevented on critical path activities for fifty percent (50%) or more of the Contractor's scheduled workday.

3.10.4.4 Within fourteen (14) calendar days after the end of a given month, the Contractor must submit its time extension request for any weather related delays along with supporting data. For instance, if the contractor requests a time extension for weather related delays during March, the request is due on April 14. If the extension request is not submitted within the aforementioned timeframe, the Contractor shall have waived any and all rights it may have against the Owner.

Add the following subparagraph 3.10.5:

3.10.5 The Contractor shall submit an updated construction schedule monthly with his application for payment. The revised schedule will demonstrate a strategy for overcoming any variances in the previous month's schedule in order to complete the project on time. Pay requests will <u>not</u> be reviewed unless accompanied by the update schedule.

#### 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

Amend subparagraph 3.12.5 by adding new sub-paragraphs 3.12.5.1 and 3.12.5.2, as follows:

3.12.5.1 Any Drawings, Schedules, and Catalog Data submitted without the Contractor's stamp of approval will not be considered by the Architect and will be returned to the Contractor.

3.12.5.2 The Contractor shall be responsible for the satisfactory construction of all Work in accordance with the quantities, dimensions, and designs shown in the Contract documents and the furnishing of all materials necessary for the Work and required by the Contract Documents even if not indicated on the submittals that have been approved by the Architect.

Amend subparagraph 3.12.8 by adding the following to the end of the paragraph:

Failure to so notify the Architect in writing of such deviations shall constitute just cause for rejection of samples and Shop Drawings, including all finished work resulting therefrom, at any time during the construction and up through the prescribed guarantee period. The Architect's approval of samples and Shop Drawings is made with the understanding that such Shop Drawings and samples conform with, and do not deviate from the Contract Documents unless Architect is so informed in writing at the time of submittal thereof.

#### 3.14 CUTTING AND PATCHING

Add to 3.14 the following subparagraph 3.14.3:

3.14.3 No cutouts, access doors or mechanical or electrical conduit or devices of any sort shall be installed in finished materials or areas other than in mechanical rooms, wall chases and shafts without specified prior approval of location, and without the prior submittal by Contractor to Owner of a sample of the proposed catalog cut.

3.18 INDEMNIFICATION Delete the wording within the parentheses in Subparagraph 3.18.1. ARTICLE 4; ADMINISTRATION OF THE CONTRACT

#### 4.1 ARCHITECT

Add to 4.1.1 the following clause 4.1.1.1:

4.1.1.1 Wherever the term "Architect" is used in the Contract Documents, it refers to <u>RRMM</u> <u>Architects</u> and/or their duly authorized representatives.

Delete Subparagraphs 4.1.2 and 4.1.3.

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

Delete subparagraph 4.2.12 and substitute the following:

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.

#### ARTICLE 5; SUBCONTRACTORS

#### 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

Delete Subparagraph 5.4.2 in its entirety.

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

#### 6.2 MUTUAL RESPONSIBILITY

Add the following subparagraph 6.2.6:

6.2.6 If any other Contractor or his subcontractors or their material suppliers shall suffer loss or damage through acts of omissions on the part of the Contractor, any subcontractor, and subsubcontractor or any material man of any foregoing, the Contractor agrees to reimburse such other Contractor or his sub-contractor or material supplier to the extent that they may be entitled to reimbursement. If such other Contractor or subcontractor or his material supplier shall assert any claim against the Owner on account of any damage alleged to have been sustained, the Owner shall notify the Contractor and the Contractor shall indemnify and save the Owner harmless from and against loss, liability, claim, damage, fee, expense, including reasonable attorney's fees of any kind whatsoever arising out of or in any way connected with any such claim and Contractor shall be rendered against the Owner in connection with any such claim, and if a judgment shall be rendered against the Owner in connection with any such claim, Contractor shall pay or satisfy any such judgment or claim and shall pay all costs, fees, expenses, disbursements and liabilities of whatsoever kind in connection therewith.

ARTICLE 7; CHANGES IN THE WORK

#### 7.3 CONSTRUCTION CHANGE DIRECTIVES

7.3.7 At the end of the first sentence, delete the words "an amount for overhead and profit as set forth in the Agreement, or if no such agreement, a reasonable amount." and substitute "an allowance for overhead and profit in accordance with Clause 7.3.11.1 through 7.3.11.6 below."

Add the following Subparagraph 7.3.11:

7.3.11 In Subparagraph 7.3.7, the allowance for the 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, ten percent of the cost.

.2 For the Contractor, for Work performance by the Contractor's Subcontractor, five percent of the amount due the Subcontractor.

.3 For each Subcontractor or Sub-subcontractor involved, for Work performed by the Subcontractor's or Sub-subcontractor's own forces, ten percent of the cost.

.4 For each Subcontractor, for Work performed by the Subcontractor's Subsubcontractors, five percent of the amount due the Sub-subcontractor.

.5 Cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 7.3.6.

.6 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and Subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also. In no case will a change involving over \$500.00 be approved without such itemization.

#### ARTICLE 9; PAYMENTS AND COMPLETION

#### 9.3 APPLICATIONS FOR PAYMENT

Add the following clause 9.3.1.3 to 9.3.1:

9.3.1.3 Until substantial completion, the Owner shall not pay more than ninety-five percent (95%) of the amount due the Contractor on account of progress payments.

#### 9.6 PROGRESS PAYMENTS

Add the following clause 9.6.8 to 9.6:

9.6.8 A payment clause that obligates a contractor on a construction contract to be liable for the entire amount owed to any subcontractor with which it contracts. Such contractor shall not be liable for amounts otherwise reducible due to the subcontractor's noncompliance with the terms of the contract. However, in the event that the contractor withholds all or a part of the amount promised to the subcontractor under the contract, the contractor shall notify the subcontractor, in writing, of his intention to withhold all or a part of the subcontractor's payment with the reason for nonpayment. Payment by the party contracting with the contractor shall not be a condition precedent to payment to any lower-tier subcontractor, regardless of that contractor receiving payment for amounts owed to that contractor. Any provision in a contract contrary to this section shall be unenforceable.

#### 9.7 FAILURE OF PAYMENT

Delete Paragraph 9.7.

#### 9.8 SUBSTANTIAL COMPLETION

Delete Paragraph 9.8.

#### 9.10 FINAL COMPLETION AND FINAL PAYMENT

Delete Subparagraph 9.10.3

Delete Subparagraph 9.10.5 and substitute the following:

9.10.5 Acceptance of final payment by the Contractor or sub-contractor or material supplier shall constitute a waiver and release of all Claims by that payee except those previously made in writing and pursued by the payee as required by the terms of the Contract Documents. Such Claims previously made must be identified by the payee as unsettled at the time of final application for payment.

Add Subparagraph 9.10.6 as follows:

9.10.6 Contractor's obligation to perform the work and complete the project in accordance with the Contract Documents shall be absolute. Neither approval of any progress or final payment nor the issuance of a certificate of substantial completion, nor any payment by Owner to Contractor under the Contract Documents, nor any use or occupancy of the project or any part thereof by Owner, nor any act of acceptance by Owner, nor any failure to do so, nor the failure of Owner to file a Claim as set forth in the Contract Documents, nor any correction of defective work by Owner, shall constitute an acceptance of work not in accordance with the Contract Documents nor shall the same relieve the Contractor of responsibility for faulty

materials or workmanship or operate to release the Contractor or his surety from any obligation under the contract, the performance bond or the payment bond. Add the following Paragraph 9.11 as follows:

#### 9.11 LIQUIDATED DAMAGES

9.11.1 Because time is of the essence and because the consequences of untimely completion of the Work cannot be quantified as of the date of this Agreement, the parties agree that the Contractor and the Contractor's surety, if any, shall be liable for and shall pay the Owner the sums hereinafter stipulated as liquidated damages, and not as a penalty, for each calendar day of delay until the Work is finally complete for any and all completion dates, <u>Five Hundred</u> U.S. Dollars (\$500.00), and Contractor further agrees that Owner may deduct and retain such liquidated damages out of any money due Contractor under the terms of this Contract.

The Owner understands the supply chain issues the roofing industry and other industries are currently dealing with and if delays are a direct result of materials not being available for delivery, the contractor shall not be held liable.

#### ARTICLE 10; PROTECTION OF PERSONS AND PROPERTY

#### 10.2 SAFETY OF PERSONS AND PROPERTY

Add to 10.2.1 the following paragraph 10.2.1.4:

10.2.1.4 Contractor's materials, tools, machinery, equipment, appliances, shoring, sheds and personal property of the Contractor's employees.

Add to 10.2.2 the following clause 10.2.2.1:

10.2.2.1 The Contractor agrees in order that work be executed with the greater degree of safety:(1) To comply with all laws, ordinances, and regulations regarding safety.

(2) To comply as applicable with the "Rules and Regulations Governing Construction Demolition and All Excavations" as adopted by the Safety Codes Commission of the Commonwealth of Virginia.

(3) To conform to all applicable provisions of the "Manual of Accident Prevention in Construction" published by the Association of General Contractor of America, Inc., latest edition.

(4) To comply with all applicable provisions of the "Occupational Safety and Health Act of 1970," as amended.

In subparagraph 10.2.5 delete the language within the parentheses.

#### 10.3 HAZARDOUS MATERIALS

Delete subparagraph 10.3.2 and in its place substitute the following:

10.3.2 The Owner shall verify the presence or absence of the material or substances reported by the Contractor and, in the event such material or substance is found to be present, verify that it has been rendered harmless. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. 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.

Delete subparagraph 10.3.3 in its entirety.

Delete subparagraph 10.5 in its entirety.

#### ARTICLE 11; INSURANCE AND BONDS

#### 11.1 CONTRACTOR'S LIABILITY INSURANCE

Add new subparagraphs 11.1.1.9 and 11.1.1.10, as follows:

11.1.1.9 Liability Insurance shall include all major divisions of coverage and be on a comprehensive basis including:

- 1. Premises Operations (including X, C, and U coverage as applicable).
- 2. Independent Contractor's Protective
- 3. Products and Completed Operations
- 4. Personal Injury Liability with Employment Exclusion deleted.
- 5. Contractual, including specified provision for Contractor's obligation under Paragraph 3.18.
- 6. Owned, non-owned and hired motor vehicles.
- 7. Broad Form Property Damage including Completed Operations.

11.1.1.10 If the General Liability coverages are provided by a Commercial General Liability Policy on a claims-made basis, the policy date or Retroactive Date shall predate the Contract; the termination date of the policy or applicable extended reporting period shall be no earlier than the termination date of coverages required to be maintained after final payment, certified in accordance with Subparagraph 9.10.2.

Add the following Clause 11.1.2.1:

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11.1.2.1 The insurance required by Subparagraph 11.1.1 shall be written for not less that the following limits, or greater if required by law:

1. Worker's Compensation

(a) \$	State:	St	atutory
(b) .	Applicable Federal (e.g., Longshoreman's):		Statutory
(c) ]	Employer's Liability:	\$100,000 per A \$100,000 Disea \$100,000 Disea	accident ase, Policy Limit ase, Each Employee
2. Inde Prop	Comprehensive or Commercial General appendent Contractor's Protective; Products a perty Damage):	Liability (including Pre and Completed Operation	mises Operations; ons; Broad Form
(a)	Bodily Injury:	\$1,000,000 \$1,000,000	Each Occurrence Aggregate
(b)	Property Damage:	\$100,000 \$1,000,000	Each Occurrence Aggregate
(c)	Products and Completed Operations to be r	maintained for one year a	fter final payment:
(d)	Property Damage Liability Insurance shall	\$1,000,000 provide X, C, and U cov	Aggregate erage
(e)	Broad Form Property Damage Coverage sh	all include Completed O	perations.
3. (a)	Contractual Liability: Bodily Injury:	\$1,000,000 \$1,000,000	Each Occurrence Aggregate
4.	Personal Injury, with Employment Exclusion	on deleted: \$1,000,	000 Aggregate
5.	Business Auto Liability (including owned,	non-owned and hired vel	hicles):
(a)	Bodily Injury:	\$1,000,000 \$1,000,000	Each Person Each Occurrence
(b) 6.	Property Damage: Umbrella Excess Liability:	\$100,000 \$2,000,000 ove \$10,000 retenti hazard	Each Occurrence or primary insurance on for self-insured s each occurrence.
11.1	.3 Add the following sentence to Subparagraph	h 11.1.3:	

If this insurance is written on the Comprehensive General Liability policy form, the

Certificates shall be AIA Document G705, Certificate of Insurance. If this insurance is written on a Commercial General Liability policy form, ACORD form 25S will be acceptable. The Certificate of Insurance shall provide an endorsement naming Suffolk Public Schools of the City of Suffolk, Virginia as Additional Insured.

#### 11.3 PROPERTY INSURANCE

Delete subparagraphs 11.3.1, 11.3.1.1, 11.3.1.2, 11.3.1.3, 11.3.1.4 and 11.3.1.5, and substitute the following:

11.3.1 Contractor or builder's risk insurance in the all-risk form shall be provided by the Contractor in a minimum amount of 100 per cent of the Contract Sum covering damage to or loss of work performed under the Contract caused by fire, explosion, wind, lightening, vandalism, malicious mischief and any other similar casualty risk or peril. The insurance shall be payable to the Owner and the Contractor as their respective interests may appear. The Owner shall be named as an additional insured in the insurance contract. Such insurance shall cover portions of the Work stored off site, and also portions of the Work in transit. Delete Subparagraphs 11.3.3, 11.3.4, 11.3.5, 11.3.6, 11.3.7, 11.3.8, 11.3.9 and 11.3.10.

#### 11.4 PERFORMANCE BOND AND PAYMENT BOND

Delete Subparagraph 11.4.1 and substitute the following:

11.4.1 The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder. Bonds shall be in the form specified in the Contract Documents with surety approved by the County Attorney. The cost of all bonds shall be included in the Contract sum. The amount of each bond shall be equal to 100 percent of the Contract sum. The bonds shall be maintained in full force and effect until final acceptance of the Work by the Owner. The Contractor will cause the surety to agree to be bound by each and every provision in the Contract Documents.

11.4.1.1 The Contractor shall deliver the required bonds to the Owner not later than the date of execution of the Contract or if the work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the commencement of the work, submit evidence satisfactory to the Owner that such bonds will be furnished.

11.4.1.2 The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

11.4.1.3 The surety will give written notice to the Owner, within seven (7) days after receipt of a declaration of default of the surety's election either to remedy the default or defaults promptly or to pay the Owner the penal sum of the bond, time being of the essence. In the notice of election, the surety shall indicate the date on which the remedy or performance will commence, and it shall then be the duty of the surety to give prompt notice in writing to the Owner immediately upon completion of (a) the remedy and/or correction of each default, (b) the remedy and/or correction of each item of Work, (c) the finishing of each omitted item of Work, and (d) the performance of the Work. The surety shall not assert insolvency of the Contractor or Contractor's denial of default as justification for its failure to promptly remedy the default or defaults or to perform the Work.

ARTICLE 13; MISCELLANEOUS PROVISIONS

13.6 INTEREST

Delete paragraph 13.6.

13.7 TIME LIMITS ON CLAIMS Delete paragraph 13.7 and all subparagraphs thereof, in their entirety.

Add a new paragraph 13.8 as follows:

#### 13.8 EQUAL OPPORTUNITY

13.8.1 During the performance of this contract, the Contractor shall maintain policies of employment as follows:

13.8.1.1 The Contractor, in accordance with Articles 5.10 and 5.11 of the IFB, will not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin, except where religion, sex or national origin is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

13.8.1.2 The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer. 13.8.1.3 Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

13.8.2 The Contractor will include the provisions of the foregoing subparagraphs 13.8.1.1, 13.8.1.2, and 13.8.1.3 in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.

ARTICLE 14; TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION OF THE CONTRACTOR

Delete Subparagraph 14.1.1.4

#### 14.2 TERMINATION BY THE OWNER FOR CAUSE

14.2.2 In the first sentence, delete "upon certification by the Initial Decision Maker that sufficient cause exists to justify such action,"

#### ARTICLE 15; CLAIMS AND DISPUTES

15.1 CLAIMS

Delete Subparagraph 15.1.1 and substitute the following:

15.1.1 Definition. A claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of the Contract Documents, payment of money, extension of time or other relief with respect to the terms of the Contract. The term "Claim" includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract but specifically does not include any Claim or demand arising for the first time after final payment is made. Claims must be made by written notice. The responsibility to substantiate claims shall rest with the party making the claim.

Delete Subparagraph 15.1.2 and substitute the following:

#### 15.1.2 NOTICE OF CLAIMS.

a. Notice. Notice of a claim by either party must be given to the other party within twenty-one (21) calendar days after occurrence of the event giving rise to such Claim or within twenty-one (21) days after the Claimant should reasonably have known of the condition giving rise to the Claim, whichever is later. Notice of claim must be made by written notice. Failure to make claims within the time period specified in this subparagraph shall be deemed a waiver of the claim.

b. Documentation. Supporting documentation of the claim shall be submitted within thirty (30) calendar days of the event on which the claim is based. Failure to submit supporting documentation within thirty (30) days bars further pursuit of the claim.

c. Additional <u>claim</u>. An additional claim made after the initial claim had been implemented by change order will not be considered unless submitted in a timely manner.

#### 15.1.5 CLAIMS FOR ADDITIONAL TIME.

Add the following to the end of subparagraph 15.1.5.1:

Requests for extension of time based on delayed deliveries of materials will not be considered, except in Owner's sole and unreviewable discretion. Submission of a bid and the time of

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completion stated thereon shall be considered confirmation of Contractor's having verified delivery dates for required materials.

#### **15.3 MEDIATION**

Delete Paragraph 15.3 and all subparagraphs thereof in their entirety.

#### 15.4 ARBITRATION

Delete paragraph 15.4 and all subparagraphs thereof in their entirety.

#### END OF SUPPLEMENTAL CONDITIONS

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# AIA<sup>°</sup> Document A305<sup>°</sup> – 2020 Exhibit A

## **General Information**

This Exhibit is part of the Contractor's Qualification Statement, submitted by and dated the day of in the year (In words, indicate day, month and year.)

#### § A.1 ORGANIZATION

- § A.1.1 Name and Location
- § A.1.1.1 Identify the full legal name of your organization.

§ A.1.1.2 List all other names under which your organization currently does business and, for each name, identify jurisdictions in which it is registered to do business under that trade name.

§ A.1.1.3 List all prior names under which your organization has operated and, for each name, indicate the date range and jurisdiction in which it was used.

§ A.1.1.4 Identify the address of your organization's principal place of business and list all office locations out of which your organization conducts business. If your organization has multiple offices, you may attach an exhibit or refer to a website.

#### § A.1.2 Legal Status

§ A.1.2.1 Identify the legal status under which your organization does business, such as sole proprietorship, partnership, corporation, limited liability corporation, joint venture, or other.

- .1 If your organization is a corporation, identify the state in which it is incorporated, the date of incorporation, and its four highest-ranking corporate officers and their titles, as applicable.
- .2 If your organization is a partnership, identify its partners and its date of organization.
- .3 If your organization is individually owned, identify its owner and date of organization.

#### **ADDITIONS AND DELETIONS:**

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

.4 If the form of your organization is other than those listed above, describe it and identify its individual leaders:

§ A.1.2.2 Does your organization own, in whole or in part, any other construction-related businesses? If so, identify and describe those businesses and specify percentage of ownership.

#### § A.1.3 Other Information

§ A.1.3.1 How many years has your organization been in business?

§ A.1.3.2 How many full-time employees work for your organization?

§ A.1.3.3 List your North American Industry Classification System (NAICS) codes and titles. Specify which is your primary NAICS code.

§ A.1.3.4 Indicate whether your organization is certified as a governmentally recognized special business class, such as a minority business enterprise, woman business enterprise, service disabled veteran owned small business, woman owned small business, small business in a HUBZone, or a small disadvantaged business in the 8(a) Business Development Program. For each, identify the certifying authority and indicate jurisdictions to which such certification applies.

#### § A.2 EXPERIENCE

§ A.2.1 Complete Exhibit D to describe up to four projects, either completed or in progress, that are representative of your organization's experience and capabilities.

§ A.2.2 State your organization's total dollar value of work currently under contract.

§ A.2.3 Of the amount stated in Section A.2.2, state the dollar value of work that remains to be completed:

§ A.2.4 State your organization's average annual dollar value of construction work performed during the last five years.

#### § A.3 CAPABILITIES

§ A.3.1 List the categories of work that your organization typically self-performs.

§ A.3.2 Identify qualities, accreditations, services, skills, or personnel that you believe differentiate your organization from others.

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§ A.3.3 Does your organization provide design collaboration or pre-construction services? If so, describe those services.

§ A.3.4 Does your organization use building information modeling (BIM)? If so, describe how your organization uses BIM and identify BIM software that your organization regularly uses.

§ A.3.5 Does your organization use a project management information system? If so, identify that system.

 § A.4 REFERENCES
 § A.4.1 Identify three client references: (Insert name, organization, and contact information)

§ A.4.2 Identify three architect references: (Insert name, organization, and contact information)

§ A.4.3 Identify one bank reference: (Insert name, organization, and contact information)

§ A.4.4 Identify three subcontractor or other trade references: (Insert name, organization, and contact information)

## Additions and Deletions Report for AIA® Document A305® – 2020 Exhibit A

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# AIA° Document A305° – 2020 Exhibit B

## Financial and Performance Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by and dated the day of in the year (In words, indicate day, month and year.)

§ B.1 FINANCIAL § B.1.1 Federal tax identification number:

§ B.1.2 Attach financial statements for the last three years prepared in accordance with Generally Accepted Accounting Principles, including your organization's latest balance sheet and income statement. Also, indicate the name and contact information of the firm that prepared each financial statement.

§ B.1.3 Has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, been the subject of any bankruptcy proceeding within the last ten years?

§ B.1.4 Identify your organization's preferred credit rating agency and identification information.

(Identify rating agency, such as Dun and Bradstreet or Equifax, and insert your organization's identification number or other method of searching your organization's credit rating with such agency.)

#### § B.2 DISPUTES AND DISCIPLINARY ACTIONS

§ B.2.1 Are there any pending or outstanding judgments, arbitration proceedings, bond claims, or lawsuits against your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, or any of the individuals listed in Exhibit A, Section 1.2, in which the amount in dispute is more than \$75,000? (If the answer is ves, provide an explanation.)

§ B.2.2 In the last five years has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management: (If the answer to any of the questions below is yes, provide an explanation.)

- failed to complete work awarded to it? .1
- been terminated for any reason except for an owners' convenience? .2

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- .3 had any judgments, settlements, or awards pertaining to a construction project in which your organization was responsible for more than \$75,000?
- .4 filed any lawsuits or requested arbitration regarding a construction project?

§ B.2.3 In the last five years, has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management; or any of the individuals listed in Exhibit A Section 1.2: (If the answer to any of the questions below is yes, provide an explanation.)

- .1 been convicted of, or indicted for, a business-related crime?
- .2 had any business or professional license subjected to disciplinary action?
- .3 been penalized or fined by a state or federal environmental agency?

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# AIA Document A305° – 2020 Exhibit C

# **Project Specific Information**

This Exhibit is part of the Contractor's Qualification Statement, submitted by and dated the day of in the year (In words, indicate day, month and year.)

PROJECT: (Name and location or address.)

SPS Innovation Center

#### CONTRACTOR'S PROJECT OFFICE:

(Identify the office out of which the contractor proposes to perform the work for the Project.)

#### TYPE OF WORK SOUGHT

(Indicate the type of work you are seeking for this Project, such as general contracting construction manager as constructor, design-build, HVAC subcontracting, electrical subcontracting, plumbing subcontracting, etc.)

#### CONFLICT OF INTEREST

Describe any conflict of interest your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, or any of the individuals listed in Exhibit A Section 1.2, may have regarding this Project.

#### § C.1 PERFORMANCE OF THE WORK

§ C.1.1 When was the Contractor's Project Office established?

§ C.1.2 How many full-time field and office staff are respectively employed at the Contractor's Project Office?

§ C.1.3 List the business license and contractor license or registration numbers for the Contractor's Project Office that pertain to the Project.

§ C.1.4 Identify key personnel from your organization who will be meaningfully involved with work on this Project and indicate (1) their position on the Project team, (2) their office location, (3) their expertise and experience, and (4) projects similar to the Project on which they have worked.

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§ C.1.5 Identify portions of work that you intend to self-perform on this Project.

§ C.1.6 To the extent known, list the subcontractors you intend to use for major portions of work on the Project.

#### § C.2 EXPERIENCE RELATED TO THE PROJECT

§ C.2.1 Complete Exhibit D to describe up to four projects performed by the Contractor's Project Office, either completed or in progress, that are relevant to this Project, such as projects in a similar geographic area or of similar project type. If you have already completed Exhibit D, but want to provide further examples of projects that are relevant to this Project, you may complete Exhibit E.

§ C.2.2 State the total dollar value of work currently under contract at the Contractor's Project Office:

§ C.2.3 Of the amount stated in Section C.2.2, state the dollar value of work that remains to be completed:

§ C.2.4 State the average annual dollar value of construction work performed by the Contractor's Project Office during the last five years.

§ C.2.5 List the total number of projects the Contractor's Project Office has completed in the last five years and state the dollar value of the largest contract the Contractor's Project Office has completed during that time.

#### § C.3 SAFETY PROGRAM AND RECORD

§ C.3.1 Does the Contractor's Project Office have a written safety program?

§ C.3.2 List all safety-related citations and penalties the Contractor's Project Office has received in the last three years.

§ C.3.3 Attach the Contractor's Project Office's OSHA 300a Summary of Work-Related Injuries and Illnesses form for the last three years.

§ C.3.4 Attach a copy of your insurance agent's verification letter for your organization's current workers' compensation experience modification rate and rates for the last three years.

#### § C.4 INSURANCE

§ C.4.1 Attach current certificates of insurance for your commercial general liability policy, umbrella insurance policy, and professional liability insurance policy, if any. Identify deductibles or self-insured retentions for your commercial general liability policy.

§ C.4.2 If requested, will your organization be able to provide property insurance for the Project written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis?

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§ C.4.3 Does your commercial general liability policy contain any exclusions or restrictions of coverage that are prohibited in AIA Document A101-2017, Exhibit A, Insurance A 3.2.2.2? If so, identify.

#### § C.5 SURETY

§ C.5.1 If requested, will your organization be able to provide a performance and payment bond for this Project?

§ C.5.2 Surety company name:

- § C.5.3 Surety agent name and contact information:
- § C.5.4 Total bonding capacity:
- § C.5.5 Available bonding capacity as of the date of this qualification statement:

# Additions and Deletions Report for

AIA® Document A305® – 2020 Exhibit C

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#### PAGE 1

SPS Innovation Center

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### **Contractor's Past Project Experience**

	1	2	3	4
PROJECT NAME	2			
PROJECT LOCATION				
PROJECT TYPE				
OWNER				
ARCHITECT				
CONTRACTOR'S PROJECT EXECUTIVE				
KEY PERSONNEL (include titles)				
PROJECT DETAILS	Contract Amount	Contract Amount	Contract Amount	Contract Amount
	Completion Date	Completion Date	Completion Date	Completion Date
	% Self-Performed Work	% Self-Performed Work	% Self-Performed Work	% Self-Performed Work
PROJECT DELIVERY METHOD	Design-bid-build Design-build CM constructor CM advisor Other:	<ul> <li>Design-bid-build</li> <li>Design-build</li> <li>CM constructor</li> <li>CM advisor</li> <li>Other:</li> </ul>	<ul> <li>Design-bid-build</li> <li>Design-build</li> <li>CM constructor</li> <li>CM advisor</li> <li>Other:</li> </ul>	<ul> <li>Design-bid-build</li> <li>Design-build</li> <li>CM constructor</li> <li>CM advisor</li> <li>Other:</li> </ul>
SUSTAINABILITY CERTIFICATIONS				

# AIA Document A305° – 2020 Exhibit E

## Contractor's Past Project Experience, Continued

	1	2	3	4
PROJECT NAME				
PROJECT LOCATION			ē	
PROJECT TYPE	3			
OWNER		- 349 C		
ARCHITECT				
CONTRACTOR'S PROJECT EXECUTIVE				
KEY PERSONNEL (include titles)				
PROJECT DETAILS	Contract Amount	Contract Amount	Contract Amount	Contract Amount
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SUSTAINABILITY CERTIFICATIONS				

#### **PRE-BID QUESTION FORM**

Τo	Linda Bates, Coordinator of Purchasing		lindahates@snsk12 net
10.	Linua Dates, Coordinator of Futenasing		
CC:	Jeff Harris, Principal, RRMM Architects		<u>jharris(<i>a</i>)rrmm.com</u>
Re:	SPS Innovation Center		
Date S	Submitted:		
Releva	nt Drawings and Specifications:		
Clarifi	ication Requested:		
(Compa	any Name)	(Sender's Name)	
(Fax No	.)	(Signature)	
Reply:			

	(Signature)
(Date)	(Title)

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#### SECTION 011000 - 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. Phased construction.
  - 4. Work performed by Owner.
  - 5. Contractor's use of site and premises.
  - 6. Coordination with occupants.
  - 7. Work restrictions.
  - 8. Specification and Drawing conventions.
- B. Related Requirements:
  - 1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
  - 2. Section 017300 "Execution" for coordination of Owner-installed products.

#### 1.3 PROJECT INFORMATION

- A. Project Identification: SPS Innovation Center, 21222-21
  - 1. Project Location: 4169 Pruden Blvd., Suffolk, VA 23434
- B. Owner: Suffolk Public Schools.
  - 1. Owner's Representative: Terry Napier, Director of Facilities and Planning, Suffolk Public Schools
- C. Architect: RRMM Architects, 1317 Executive Boulevard, Suite 200, Chesapeake, Virginia 23320.
- D. Architect's Consultants: Architect has retained the following design professionals, who have prepared designated portions of the Contract Doc00uments:
  - 1. Structural: Speight, Marshall, & Francis, P.C.

SUMMARY

- a. Structural Engineers, 1228 Perimeter Parkway, Suite 201. Virginia Beach, VA 23454
- 2. Mechanical, Electrical, and Plumbing: Thompson Consulting Engineers, Inc.
  - a. Mechanical, Electrical, and Plumbing Engineering, 22 Enterprise Parkway Suite 200. Hampton, VA 23666

#### 1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:
  - 1. The scope of work consists of the conversion of an existing facility with the primary function of a daycare to an administrative/office use. This change constitutes a change of occupancy from an "E" occupancy to a "B" occupancy, and includes the addition of new partitions, ceilings, interior finish upgrades, and associated plumbing, mechanical, and electrical modifications. Additionally, the building envelope will be modified where 2 existing roll up doors will be infilled with a combination of new exterior walls and glazing.
- B. Type of Contract:
  - 1. Project will be constructed under a single prime contract.

#### 1.5 WORK PERFORMED BY OWNER

- A. 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.
- B. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with Work under this Contract.
  - 1. Data/IT Systems: A separate contract will be awarded to for the installation of wiring and devices. Contractor is responsible for infrastructure only.
  - 2. Coordinate with the Owner regarding schedule and delivery of furniture and equipment noted as "Not In Contract" (N.I.C), including furnishings as indicated in the drawings.
  - 3. Restroom Accessories: As indicated in the drawings, all paper towel, toilet tissue, and soap dispensers shall be provided by the owner's sanitary product supplier and installed by the contractor.

#### 1.6 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Limits on Use of Site: Limit use of Project site to **areas** within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
  - 1. Driveways, Walkways and Entrances: Keep driveways, parking, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and

emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

- a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
- b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- B. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- C. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

#### 1.7 COORDINATION WITH OCCUPANTS

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
  - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
  - 2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

#### 1.8 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
  - 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work to between 7:00 a.m. to 7:00 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.
  - 1. Weekend Hours: 7:00 am and to 7:00pm with Owner's prior approval.
  - 2. Early Morning Hours: with Owner's prior approval
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:
  - 1. Notify Architect and Owner not less than 5 days in advance of proposed utility interruptions.

- 2. Obtain Architect's and Owner's written permission before proceeding with utility interruptions.
- D. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances on Owner's property is not permitted.
- E. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- F. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
  - 1. Maintain list of approved screened personnel with Owner's representative.

#### 1.9 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. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
  - 3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
  - 4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- D. 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 published as part of the U.S. National CAD Standard.
  - 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 011000

#### SECTION 012100 - 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.
- B. Types of allowances include the following:
  - 1. Lump-sum allowances.
  - 2. Unit-cost allowances.
  - 3. Quantity allowances.
  - 4. Contingency allowances.
  - 5. Testing and inspecting allowances.
- C. Related Requirements:
  - 1. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

#### 1.3 DEFINITIONS

A. Allowance: A quantity of work or dollar amount included in the Contract, established in lieu of additional requirements, used 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.

#### 1.4 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner 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.
- C. Purchase products and systems selected by Architect from the designated supplier.
#### 1.5 ACTION SUBMITTALS

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

#### 1.6 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.

#### 1.7 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 [taxes, ]freight[,] and delivery to Project site.
- 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 ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

#### 1.8 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, required maintenance materials, 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 markups.
- B. Submit claims for increased costs due to a change in the 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: Lump-Sum Allowance: Include the sum of \$20,000 for miscellaneous hazardous material abatement in the event any is encountered.
  - 1. This allowance includes material, receiving, handling, and installation costs, and Contractor overhead and profit.
- B. Allowance No. 2: Lump Sum Allowance: Include the sum of \$5,000 for unforeseen conditions related to removal of the slab in Restroom 120 and related plumbing work.

# SECTION 012300 - ALTERNATES

## 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 alternates.

#### 1.3 DEFINITIONS

- A. Bid Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
  - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
  - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

#### 1.4 **PROCEDURES**

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
  - 1. Include, as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation, whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other Work of the Contract.
- C. Schedule: A Part 3 "Schedule of Alternates" Article is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

# 3.1 SCHEDULE OF ALTERNATES

- A. Bid Alternate No. 1
  - 1. This alternate includes the removal and replacement of the (2) existing rooftop mechanical units and (2) exhaust fans with 1 new rooftop unit and new exhaust fans. This scope includes all associated ductwork, Variable Air Volume (VAV) boxes, controls, ceilings, structural reinforcement, and all associated electrical, plumbing, and mechanical modifications. Additionally the alternate includes the removal of existing, non load bearing, CMU wall partitions at the existing Break Room and Locker Rooms to accommodate a larger break area and work room with associated new floor, wall, and ceiling finishes, light fixtures, and ductwork.

# SECTION 012500 - 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. Document 002600 "Procurement Substitution Procedures" for requirements for substitution requests prior to award of Contract.
  - 2. Section 012100 "Allowances" for products selected under an allowance.
  - 3. Section 012300 "Alternates" for products selected under an alternate.
  - 4. Section 016000 "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.
  - 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 to meet other Project requirements but may offer advantage to Contractor or Owner.

## 1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.

- b. Coordination of 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 substitutions 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 as well as 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] <Insert applicable code organization>.
- j. Detailed comparison of Contractor's construction schedule using proposed substitutions 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.
- 1. 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.
- Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within (7) 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 (7) 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.

## 1.7 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than (15) fifteen 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. Substitution request is fully documented and properly submitted.
    - c. Requested substitution will not adversely affect Contractor's construction schedule.
    - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - e. Requested substitution is compatible with other portions of the Work.
    - f. Requested substitution has been coordinated with other portions of the Work.
    - g. Requested substitution provides specified warranty.
    - h. 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 2 - EXECUTION (Not Used)

# SECTION 012600 - 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 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
  - 2. Section 013100 "Project Management and Coordination" for requirements for forms for contract modifications provided as part of web-based Project management software.

#### 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.

#### 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 (20) days 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.
- 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 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

## 1.5 ADMINISTRATIVE CHANGE ORDERS

A. Allowance Adjustment: See Section 012100 "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 an approved change order form.

## 1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive Change Directive, which 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)

# SECTION 012900 - 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. Document 004373 "Proposed Schedule of Values Form" for requirements for furnishing proposed schedule of values with bid.
  - 2. Section 012100 "Allowances" for procedural requirements governing the handling and processing of allowances.
  - 3. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
  - 4. Section 013200 "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 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. Owner's name.
- c. Name of Architect.
- d. Architect's Project number.
- e. Contractor's name and address.
- f. Date of submittal.
- 2. 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. Change Orders (numbers) that affect value.
  - d. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.
    - 1) Labor.
    - 2) Materials.
    - 3) Equipment.
- 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
- 4. 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.
- 5. Overhead Costs, Proportional Distribution: Include total cost and proportionate share of general overhead and profit for each line item.
- 6. Temporary Facilities: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
- 7. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

## 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.
- B. Payment Application Times: The date for each progress payment is indicated in the Owner/Contractor Agreement. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
  - 1. Submit draft copy of Application for Payment three days prior to due date for review by Architect.

- C. Application for Payment Forms: Use Schedule of Values and approved format for Certificate of Payment 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.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
  - 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 four signed and notarized original copies of each Application for Payment to Architect a method ensuring receipt 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 lien 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. Schedule of unit prices.
  - 5. Submittal schedule (preliminary if not final).
  - 6. List of Contractor's staff assignments.
  - 7. Copies of building permits.
  - 8. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  - 9. Report of preconstruction conference.
  - 10. Certificates of insurance and insurance policies.
  - 11. Performance and payment bonds.
  - 12. 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.
- 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. Evidence that claims have been settled.
  - 5. 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.
  - 6. Final liquidated damages settlement statement.

## PART 2 - PRODUCTS (Not Used)

# PART 3 - EXECUTION (Not Used)

## END OF SECTION 012900

## PAYMENT PROCEDURES

# SECTION 013100 - 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. RFIs.
  - 4. Digital project management procedures.
  - 5. Web-based Project management software package.
  - 6. 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 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
  - 2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
  - 3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.
  - 4. Section 019113 "General Commissioning Requirements" for coordinating the Work with Owner's Commissioning Authority.

## 1.3 DEFINITIONS

- A. BIM: Building Information Modeling.
- B. RFI: Request for Information. 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, telephone number, and email address 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 15 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, 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, in web-based Project software directory, and in prominent location in built facility. 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. 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.
- C. 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.

#### PROJECT MANAGEMENT AND COORDINATION

- 5. Progress meetings.
- 6. Preinstallation conferences.
- 7. Project closeout activities.
- 8. Startup and adjustment of systems.

# 1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated 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 coordination drawings 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 Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative 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. Review: Architect will review coordination drawings to confirm that, in general, 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 suitable modifications and resubmit.

- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
  - 1. File Preparation Format:
    - a. Same digital data software program, version, and operating system as original Drawings.
  - 2. File Submittal Format: Submit or post coordination drawing files using PDF format.
  - 3. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
    - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
    - b. Digital Data Software Program: Drawings are available in <Insert name and
    - c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.

# 1.7 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
  - 1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
  - 2. Coordinate and submit RFIs in a prompt manner 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. Owner name.
  - 3. Name of Architect.
  - 4. Architect's Project number.
  - 5. Date.
  - 6. Name of Contractor.
  - 7. RFI number, numbered sequentially.
  - 8. RFI subject.
  - 9. Specification Section number and title and related paragraphs, as appropriate.
  - 10. Drawing number and detail references, as appropriate.
  - 11. Field dimensions and conditions, as appropriate.
  - 12. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  - 13. Contractor's signature.
  - 14. 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. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven 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 by Architect 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 012600 "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 5 days of receipt of the RFI response.
- D. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log monthly. Use software log that is part of web-based Project management software.
  - 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.
  - 8. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.
- E. 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 five days if Contractor disagrees with response.

## 1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Architect's Data Files Not Available: Architect will not provide Architect's BIM model or CAD drawing digital data files for Contractor's use during construction.

- B. Use of Architect's Digital Data Files: Digital data files of Architect's BIM model or CAD drawings will be provided by Architect for Contractor's use during construction.
  - 1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project Record Drawings.
  - 2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
  - 3. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.
  - 4. The following digital data files will be furnished for each appropriate discipline:
    - a. Floor plans.
    - b. Reflected ceiling plans.
- C. Web-Based Project Management Software Package: Use Architect's web-based Project management software package for purposes of hosting and managing Project communication and documentation until Final Completion.
  - 1. Web-based Project management software includes, at a minimum, the following features:
    - a. Compilation of Project data, including Contractor, subcontractors, Architect, Architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
    - b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
    - c. Document workflow planning, allowing customization of workflow between project entities.
    - d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
    - e. Track status of each Project communication in real time, and log time and date when responses are provided.
    - f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
    - g. Processing and tracking of payment applications.
    - h. Processing and tracking of contract modifications.
    - i. Creating and distributing meeting minutes.
    - j. Document management for Drawings, Specifications, and coordination drawings, including revision control.
    - k. Management of construction progress photographs.
    - 1. Mobile device compatibility, including smartphones and tablets.
- D. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
  - 1. Assemble complete submittal package into a single indexed file, incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.

- 2. Name file with submittal number or other unique identifier, including revision identifier.
- 3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

## 1.9 **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 a minimum of seven days prior to meeting.
  - 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. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, 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.
  - 2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Responsibilities and personnel assignments.
    - b. Tentative construction schedule.
    - c. Phasing.
    - d. Critical work sequencing and long lead items.
    - e. Designation of key personnel and their duties.
    - f. Lines of communications.
    - g. Use of web-based Project software.
    - h. Procedures for processing field decisions and Change Orders.
    - i. Procedures for RFIs.
    - j. Procedures for testing and inspecting.
    - k. Procedures for processing Applications for Payment.
    - 1. Distribution of the Contract Documents.
    - m. Submittal procedures.
    - n. Sustainable design requirements.
    - o. Preparation of Record Documents.
    - p. Use of the premises and existing building.
    - q. Work restrictions.
    - r. Working hours.
    - s. Owner's occupancy requirements.
    - t. Responsibility for temporary facilities and controls.

- u. Procedures for moisture and mold control.
- v. Procedures for disruptions and shutdowns.
- w. Construction waste management and recycling.
- x. Parking availability.
- y. Office, work, and storage areas.
- z. Equipment deliveries and priorities.
- aa. First aid.
- bb. Security.
- cc. Progress cleaning.
- 3. 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 when required by other Sections and when required for 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.
- D. Progress Meetings: Conduct progress meetings at bi-monthly 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) Status of submittals.
      - 4) Status of sustainable design documentation.
      - 5) Deliveries.

- 6) Off-site fabrication.
- 7) Access.
- 8) Site use.
- 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

# SECTION 013200 - 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. Startup construction schedule.
  - 2. Contractor's Construction Schedule.
  - 3. Construction schedule updating reports.
  - 4. Daily construction reports.
  - 5. Material location reports.
  - 6. Site condition reports.
- B. Related Requirements:
  - 1. Section 012900 "Payment Procedures" for schedule of values and requirements for use of cost-loaded schedule for Applications for Payment.
  - 2. Section 014000 "Quality Requirements" for schedule of tests and inspections.

#### 1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.
  - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
  - 2. Predecessor Activity: An activity that precedes another activity in the network.
  - 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the schedule of values for completing an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine the critical path of Project and when activities can be performed.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Event: The starting or ending point of an activity.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
  - 1. PDF file
  - 2. Two (2) Paper copies.
  - 3. Native format electronic schedule file.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
  - 1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.
- C. Construction Schedule Updating Reports: Submit with Applications for Payment.
- D. Daily Construction Reports: Submit in accordance with paragraph 3.1B.
- E. Unusual Event Reports: Submit at time of unusual event.
- F. Qualification Data: For scheduling consultant.

#### 1.5 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. 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.

## 1.6 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules by Oracle/Primavera (P3 or Sure Trak) or Microsoft (Project).
- B. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.

- 1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
- 2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- C. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.
  - 1. Contract completion date to not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- 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.
  - 1. Temporary enclosure and space conditioning.
- E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
  - 1. See Section 012900 "Payment Procedures" for cost reporting and payment procedures.
- F. 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 the Contract Time.
- G. Contractor's Construction Schedule Updating: At bi-monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule two (2) days 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.
- H. Recovery Schedule: When periodic update indicates the Work is fourteen (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.

- I. 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.

## 1.7 CPM SCHEDULE REQUIREMENTS

- A. CPM Schedule: Prepare Contractor's construction schedule using a time-scaled CPM network analysis diagram for the Work.
  - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than fourteen (14) days after date established for the Notice to Proceed.
    - a. Failure to include any work item required for performance of this Contract must not excuse Contractor from completing all work within applicable completion dates.
  - 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
  - 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
  - 4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.

## 1.8 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. Emergency procedures.
  - 12. Orders and requests of authorities having jurisdiction.

#### CONSTRUCTION PROGRESS DOCUMENTATION

- 13. Change Orders received and implemented.
- 14. Construction Change Directives received and implemented.
- 15. Partial completions and occupancies.
- 16. 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.
- C. Unusual Event Reports: 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, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.
  - 1. Submit unusual event reports directly to Owner within 1 day of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

# SECTION 013300 - SUBMITTAL PROCEDURES

## PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Submittal schedule requirements.
  - 2. Administrative and procedural requirements for submittals.

#### B. Related Requirements:

- 1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
- 2. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
- 3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
- 4. Section 013233 "Photographic Documentation" for submitting preconstruction photographs, periodic construction photographs, and Final Completion construction photographs.
- 5. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
- 6. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
- 7. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
- 8. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

## 1.2 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."

## 1.3 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list 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 Schedule: 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 Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.
  - a. Submit revised submittal schedule as required 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.

#### 1.4 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
  - 1. Project name.
  - 2. Date.
  - 3. Name of Architect.
  - 4. Name of Contractor.
  - 5. Names of subcontractor, manufacturer, and supplier.
  - 6. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
  - 7. Category and type of submittal.
  - 8. Submittal purpose and description.
  - 9. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
  - 10. Drawing number and detail references, as appropriate.
  - 11. Remarks.
  - 12. Signature of transmitter.
- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on

previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

- D. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.
- E. Submittals Utilizing Web-Based Project Software: Prepare submittals as PDF files or other format indicated by Project management software.

## 1.5 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
  - 1. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.
- 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 submittals for related parts of the Work specified in different Sections, 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 days for initial review of each submittal. 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 days for initial review of each submittal.
- D. 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.
- E. 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.
- F. 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.

## 1.6 SUBMITTAL REQUIREMENTS

- A. 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 unsuitable 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 that show 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 Shop Drawings, and before or concurrently with Samples.
- B. 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 unless submittal based on Architect's digital data drawing files is otherwise permitted.
  - 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.
- C. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.
  - 1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
  - 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
    - a. Project name and submittal number.
    - b. Generic description of Sample.
    - c. Product name and name of manufacturer.
    - d. Sample source.
    - e. Number and title of applicable Specification Section.
    - f. Specification paragraph number and generic name of each item.
  - 3. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
  - 4. Disposition: Maintain sets of approved Samples at Project site, available for qualitycontrol comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    - a. 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.
- D. 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.
- E. 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.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:
  - 1. Certificates and Certifications Submittals: Submit 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. Provide a notarized signature where indicated.
  - 2. 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.
  - 3. 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.
  - 4. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
  - 5. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
  - 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.
- H. Test and Research Reports:

- 1. 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 substrate preparation and primers required.
- 2. 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.
- 3. 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.
- 4. 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.
- 5. 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.
- 6. 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:
  - a. Name of evaluation organization.
  - b. Date of evaluation.
  - c. Time period when report is in effect.
  - d. Product and manufacturers' names.
  - e. Description of product.
  - f. Test procedures and results.
  - g. Limitations of use.

# 1.7 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 insufficient 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 digitally signed PDF file 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.

#### 1.8 CONTRACTOR'S REVIEW

- A. Action Submittals 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. Contractor's Approval: Indicate Contractor's approval for each submittal with indication in web-based Project management software. Include 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.
  - 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

#### 1.9 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return.
  - 1. Submittals by Web-Based Project Management Software: Architect will indicate, on Project management software website, the appropriate 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. Architect will return without review submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)
# SECTION 014000 - QUALITY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection 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 quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other qualityassurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, Commissioning Authority, or authorities having jurisdiction are not limited by provisions of this Section.

### 1.2 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, 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.
- B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. 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, assembly, and similar operations.
  - 1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.
- E. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) in accordance with 29 CFR 1910.7, by a testing agency accredited in accordance with NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or

by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

- F. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" has the same meaning as the term "testing agency."
- H. 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.
- I. 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. Contractor's quality-control services do not include contract administration activities performed by Architect.

#### 1.3 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified is 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.

### 1.4 INFORMATIONAL SUBMITTALS

- A. 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.
- B. 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.
- C. Reports: Prepare and submit certified written reports and documents as specified.
- D. Permits, Licenses, and Certificates: For Owner's record, 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.

#### 1.5 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, telephone number, and email address 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 inspection.
  - 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, telephone number, and email address 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 of 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, telephone number, and email address 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 of whether conditions, products, and installation will affect warranty.
- 5. Other required items indicated in individual Specification Sections.

#### 1.6 QUALITY ASSURANCE

- A. 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. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- 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, applying, 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 is similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities be performed by entities who are recognized experts in those operations. Specialists will satisfy qualification requirements indicated and engage in the activities indicated.
  - 1. Requirements of authorities having jurisdiction supersede requirements for specialists.
- G. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329, and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- 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, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
  - 1. Contractor's Responsibilities:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    - d. Build site-assembled test assemblies and mockups, using installers who will perform same tasks for Project.
    - e. When testing is complete, remove test specimens and test assemblies do not reuse products on Project.
  - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect with copy to Contractor. Interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.

# 1.7 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
  - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
  - 2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
  - 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. Engage a qualified testing agency to perform quality-control services.
    - a. Contractor will 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 inspection 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 inspection 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.
- C. 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.
- D. 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 locations 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 duties of Contractor.
- E. 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 013300 "Submittal Procedures."
- F. 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.
- G. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives 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 inspection. Assist agency in obtaining samples.

- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
  - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

# 1.8 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in the Statement of Special Inspections attached to this Section and as follows:
  - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures, and reviewing 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.
  - 1. Submit log at Project closeout as part of Project Record Documents.

# 3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, 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 017300 "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 014000

### SECTION 014100 - SPECIAL INSPECTION SERVICES

#### 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 SUMMARY

- A. This Section includes administrative and procedural requirements for Special Inspection services.
- B. Certain structural components of the Project will be subject to the requirements for Special Inspections. Special Inspections will be applicable to the following specification sections:
  - 1. Division 5 Section Structural Steel Framing
- C. Requirements for Special Inspections are outlined in the Statement and Schedule of Special Inspections included at the end of this section.
- D. The Owner will procure and bear all costs of the Special Inspector, except as otherwise noted. The Special Inspector will be the manager of the Special Inspection process. The Special Inspector checks the certification of all other inspecting agents required by Special Inspections and coordinates their activities. The Special Inspector carries the exclusive responsibility for assuring that the inspections indicated are performed. The Statement of Special Inspections will be required by the Building Official as a condition for building permit issuance.
- E. Special Inspections are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with 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 qualityassurance 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
- F. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section "Quality Control" specifies requirements for repair and restoration of construction disturbed by inspection and testing activities.

#### 1.3 **RESPONSIBILITIES**

- A. Contractor Responsibilities: Contractor shall provide and include in the Contract Sum, inspections, tests, and other similar quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction except where they are specifically indicated to be the Owner's responsibility, or are provided by another identified entity.
  - 1. Retesting: The Contractor is responsible for retesting where results of inspections, tests, or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility.
    - a. The Contractor shall correct deficiencies in work that inspections and laboratory test reports have indicated to be not in compliance with requirements.
    - b. The cost of retesting construction, revised or replaced by the Contractor, is the Contractor's responsibility where required tests performed on original construction indicated noncompliance with Contract Document requirements.
  - 2. 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.
    - a. 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. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:
    - a. Provide access to the Work.
    - b. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
    - c. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
    - d. Provide and maintain for the sole use of the Special Inspector or Special Inspectors adequate facilities for safe storage and proper curing of test samples on the Project Site.
    - e. Provide the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
    - f. Provide security and protection of samples and test equipment at the Project Site.
    - g. The Contractor shall designate a representative (the superintendent or an assistant to the superintendent) who shall be the direct point-of-contact with the Special Inspector during each phase of the work. Discrepancies noted during the progress of

the work will be reported to the Contractor's representative for corrective action. Communications given by the Special Inspector to the Contractor's representative shall be as binding as if given to the Contractor.

- B. Special Inspector Responsibilities:
  - 1. The Special Inspector shall conduct and interpret tests, state in each report whether test specimens comply with requirements, specifically state any deviations thereforem, and record work required and performed to correct deficiencies.
  - 2. The Special Inspector will keep records of all inspections and tests which will be furnished to the Building Official, the Architect, and the Structural Engineer of Record.
  - 3. The Special Inspector shall notify the Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services. All discrepancies will be brought to the immediate attention of the Contractor for correction. If discrepancies are not corrected, the discrepancies will be brought to the attention of the Building Official and the Structural Engineer of Record.
  - 4. A final report documenting completion of all required special inspections and corrections of any discrepancies noted will be submitted to the Building Official by the Special Inspector prior to, and as a condition of, issuance of the Certificate of Use and Occupancy.
  - 5. The Special Inspector shall not perform any duties of the Contractor.
- C. Coordination: The Contractor and each agency engaged to perform inspection, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition the Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
  - 1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

### 1.4 SUBMITTALS

- A. The Special Inspector shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Architect, unless the Contractor is responsible for this service. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.
  - 1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
  - 2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
    - a. Date of issue.
    - b. Project title and number.
    - c. Name, address, and telephone number of testing agency.

- d. Dates and locations of samples and tests or inspections.
- e. Names of individual making the inspection or test.
- f. Designation of the Work and test method.
- g. Identification of product and Specification Section.
- h. Complete inspection or test data.
- i. Test results and an interpretation of test results.
- j. Ambient conditions at the time of sample taking and testing.
- k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
- 1. Name and signature of laboratory inspector
- m. Recommendations on retesting.

#### 1.5 QUALITY ASSURANCE

A. Qualification for Special Inspector: The Special Inspector, if other than the Engineer of Record, shall be a Registered Professional Engineer, Licensed in the Commonwealth of Virginia, experienced in performing special inspections and shall be approved by the Architect. The qualifications of all personnel performing Special Inspection activities are also subject to the approval of the Building Official. The credentials of all Inspectors and testing technicians shall be provided if requested.

#### PART 2 - PRODUCTS (Not Applicable)

#### PART 3 - EXECUTION

#### 3.1 REPAIR AND PROTECTION

- A. Protect construction exposed by or for quality-control service activities, and protect repaired construction.
- B. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

# **END OF SECTION**

# Appendix A

# HAMPTON ROADS AREA STATEMENT OF SPECIAL INSPECTIONS

PROJECT	PERMIT APPLICANT
SPS Innovation Center	

PRIMARY RDP OF RECORD	STRUCTURAL ENGINEER OF RECORD
RRMM Architects	SPEIGHT MARSHALL & FRANCIS
1317 Executive Blvd., Suite 200	1228 Perimeter Parkway, Suite 201
Chesapeake, VA 23320	Virginia Beach VA 23454

This Statement of Special Inspections is submitted as a condition for permit issuance in accordance with the International Building Code (IBC) as stated in the Virginia Uniform Statewide Building Code (USBC). It includes a Schedule of Special Inspections applicable to this project as well as the name of the Special Inspector, and the identity of other testing laboratories or agencies intended to be retained for conducting these inspections or tests.

The Special Inspector shall keep records of all inspections, and shall furnish inspection reports to the Building Official, appropriate Registered Design Professional(s) (RDP(s)), Owner and Contractor. All discrepancies shall be brought to the immediate attention of the Contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the Building Official and appropriate RDP(s). Interim reports shall be submitted to the Building Official, Owner, Contractor, and the appropriate RDP(s) according to the *Hampton Roads Regional Special Inspection Guidelines and Procedures*.

Jobsite safety is solely the responsibility of the contractor. Materials and activities to be inspected are not to include the contractor's equipment and methods used to erect or install the materials listed. All fees/costs related to the performance of Special Inspections shall be the responsibility of the Owner. Additionally, the undersigned (RDP or SER) are only acknowledging that the items enumerated on the Schedule of Special Inspections are consistent with the required design elements, the applicable sections of the Uniform Statewide Building Code, and their area of expertise.

## **REVIEW, AUTHORIZATION & ACCEPTANCE**

Permit Applicant (General Contractor):						
Signature / date:						
Printed Name:						

Owner's Authorization (If other than Applicant): Signature / date: Printed Name:

Primary RDP of Record: (Review and Acceptance of Schedule) Signature / date: Printed Name:

SER of Record: (Review and Acceptance of Schedule) Signature / date: Printed Name: Earl H. Inge, Jr., P.E.

Building Official's Acceptance: Signature / date: Printed Name:





Virginia RDP Seal of SI Preparer

Earl H. Inge, Jr., P.E. Printed Name of the Preparer of the Schedule (on line above)

Special Inspector: Signature / date: Printed Name: Earl H. Inge, Jr., P.E. SI Company Name: Speight, Marshall & Francis

# SCHEDULE OF SPECIAL INSPECTIONS

MATERIAL/ACTIVITY	TYPE OF INSPECTION	APPLICABLE TO THIS PROJECT				
		Y/N/P/C	EXTENT/REFERENCE	AGENT	COMPLETED	
GENERAL	·		·			
Pre-construction conference	Meeting with parties listed in Section 6 of the HRRSIGP to discuss Special Inspection procedures	Y	Scheduled by SI with the Contractor prior to commencement of work; VCC 113.4	1		
EARTHWORK		-		•		
Site preparation (structure)	Field testing and inspection	N	Field review, VCC 1705.6			
Fill material (structure)	Review submittals, field testing and inspection	N	Field review, VCC 1705.6			
Fill compaction (structure)	In-place density tests, lift thickness	N	Field review, VCC 1705.6			
Excavation	Field inspection and verification of proper depth	N	Field review, VCC 1705.6			
Foundation sub-grade (structure)	Field inspection of foundation subgrade prior to placement of concrete	N	Field review, VCC 1705.6			
DEEP FOUNDATION ELEMENTS	••		·	•		
Materials	Review product, sizes, and lengths	N	Submittal & Field Review; VCC 1705.7, 1705.8, 1705.9			
Test piles	Monitor driving of test piles	N	Field Review; VCC 1705.8, 1704.9 or 1704.10			
Installation	Monitor drilling, placement, plumbness, driving of piles, including recording blows per foot, cut off and tip elevation	N	Field Review; VCC 1705.2, 1705.3, 1705.7			
Load test	Monitor pile load test	N	Field Review; VCC 1705.8, 1704.9 or 1704.10			
CONCRETE						
Materials	Review product supplied versus certificates of compliance and mix design	N	Submittal & Field Review; ACI 318; Ch. 19,26.4.3, 26.4.4; VCC 1705.3, 1903.2, 1908.2, 1903.4			
Installation of reinforcing steel, including prestress tendons and anchor bolts as well as welding	Field inspection of placement	N	Submittal & Field Review; ACI 318: Ch. 20, 25.2, 25.3, 26.5.1-26.5.3; AWS D1.4; VCC 1705.3, 1901.3, 1908.4			
Formwork installation	Field inspection	N	Field Review; ACI 318; VCC 1705.3			
Concreting operations & placement	Field inspection of placement/sampling	N	Field Review; ACI 318: 26.5.2, 26.12.3; ASTM C 172, C 31; VCC 1705.3, 1908.6, 1908.7, 1908.8, 1908.10			
Concrete curing	Field inspection of curing process	N	Field Review, ACI 318: 26.5.3, 26.5.4; VCC 1705.3, 1908.9			
Concrete strength	Evaluation of concrete strength	N	Laboratory Testing; ACI 318: 26.12; VCC 1705.3			
Application of forces for prestressed concrete	Field inspection	N	Field Review; ACI 318: 26.10.2(c); VCC 1705.3			

MATERIAL/ACTIVITY	TYPE OF INSPECTION	APPLICABLE TO THIS PROJECT				
		Y/N/P/C	EXTENT/REFERENCE	AGENT	COMPLETED	
Grouting of prestress tendons	Field inspection	N	Field Review; ACI 318: 19.4.1,			
			20.6.4, 26.13.3.2(b): VCC 1705.3			
PRECAST CONCRETE	1	-	T			
Verify fabrication/quality control	In-plant inspection of fabrication/quality control	N	Submittal or Field Review;			
procedures	procedures**		VCC 1705.3			
Erection and Installation	Review submittals and as-built assemblies; Field	N	Submittal & Field Review; ACI 318;			
	inspection of in-place precast		VCC Table 1705.3			
MASONRY (LevelA; Based	on Occupancy CategoryA)				-	
Materials	Review of products supplied versus certificate of	N	Submittal & Field Review; ACI			
	compliance and material submitted		530/ASCE 5; ACI 530.1/ ASCE 6;			
			VCC 1705.4, 1709			
Strength	Testing/review of strength	N	Submittal & Field Reports; ACI 530/			
			ASCE 5; ACI 530.1/ASCE 6; VCC			
			1705.4, 2105			
Mortar and grout	Inspection of proportioning, mixing. Placement of	N	Field Review; VCC 1705.4; ACI			
, , , , , , , , , , , , , , , , , , ,	mortar only.		530/ASCE 5; ACI 530.1/ASCE 6			
Grout placement, including	Verification to ensure compliance	N	Field Review; VCC 1705.4; ACI			
prestressing grout			530/ASCE 5; ACI 530.1/ ASCE 6			
Grout Space	Verification to ensure compliance	N	Field Review; VCC 1705.4; ACI			
			530/ASCE 5: ACI 530.1/ ASCE 6:			
			TMS 602			
Mortar, grout and prism	Observe Preparation	N	Field Review: VCC 1705.4: ACI			
specimens			530.1: ASCE 6			
Reinforcement, prestressing,	Inspect condition, size, location and spacing	N	Field Review: VCC 1705.4: ACI			
tendons, and connections	······································		530/ASCE 5: ACI 530.1/ASCE 6			
Welding of reinforcing bars	Inspection and testing of welds	N	Field Review: VCC 1705.4: ACI			
······································			530/ASCE 5: ACI 530.1/ASCE 6			
Prestressing force	Verify application and measurement	N	Field Review: VCC 1705 4: ACI			
· · · · · · · · · · · · · · · · · · ·			530/ASCE 5: ACI 530.1/ ASCE 6			
Protection	Inspect procedures for protection during cold and hot	N	Field Review: VCC 1705 4: ACI			
	weather		530/ASCE 5' ACI 530 1/ ASCE 6			
Anchorage	Inspection of anchorages	N	Field Review: VCC 1705 4: ACI			
, anonorago	moposition of alloholagoo		530 1/ASCE 6: ACI 530/ASCE 5			
Masonry installation	Inspection of placement of masonry and joints	N	Field Review: VCC 1705 4: ACI			
Maconly motalication	moposition of placement of maconity and jointe		530/ASCE 5: ACI 530:1/ ASCE 6			
STRUCTURAL STEEL						
Verify fabrication/quality control	In-plant inspection of fabrication/quality control	Y	Submittal or Field Review: VCC	1		
procedures	procedures** or submit Certificate of Compliance	•	1704 2 5 1704 2 5 1 1705 2	1		
Bolts nuts and washers-	Material identification markings	N	Submittal & Field Review: VCC			
materials	Review of Certificate of Compliance		1705 2 1 1706: ASTM: AISC 360			
			Section A3.3			
Bolts nuts and washers-	Inspection of in-place high-strength holts, spug-tight	N	Submittal & Field Review: VCC			
installation	ioints pre-tensioned and bearing type and slip critical		1705 2 1 2204 2 AISC 360			
	connections		Section M2 5			

MATERIAL/ACTIVITY	TYPE OF INSPECTION	APPLICABLE TO THIS PROJECT			
		Y/N/P/C	EXTENT/REFERENCE	AGENT	COMPLETED
Structural steel-materials	Material identification markings and review of Certificate of Compliance	Y	Submittal & Field Review; VCC 1705.2.1, 1706; ASTM A6, A568; AISC 360 Section A3.1	1	
Structural steel details - installation	Inspection of member locations, structural details for bracing, connections, stiffening	P	Submittal & Field Review; VCC 1705.2.1, 1705.2.2, AISC 360	1	
Open-web steel joists and joist girders – installation	Inspection of end connections and bridging	N	Submittal & Field Review; VCC 1705.2.3		
Weld filler materials and welder certification	Review of identification markings, certificate of compliance, and welder certification	Y	Submittal & Field Review; ASTM; AISC 360 A3.5	1	
Welds	Inspection and testing of welds	Р	Field Review; VCC 1705.2, 2204.1; AWS D1.1, D1.3	1	
Cold-formed metal deck - materials	Review of identification marking manufacturer's certified test results	N	Submittal & Field Review; VCC 1705.2.2; ASTM		
Cold-formed metal deck - installation	Review laps and welds	N	Submittal & Field Review; IBC 1705.2.2, AWS D1.3		
Cold-formed light frame construction - welds	Review welding operation	N	Field Review; VCC 1705.11, 1705.11.2, 1705.11.3		
Cold form light frame construction wind resistance - screws	Review screw attachment bolting, anchoring hold downs, bracing, diaphragms, struts	N	Field Review; VCC 1705.11, 1705.11.2, 1705.11.3		
Cold-formed steel trusses spanning 60' or greater	Inspection of temporary and permanent restraints/bracing	N	Submittal & Field Review; VCC 1705.2.4		
WOOD			·	<u> </u>	
Verify fabrication/quality control procedures	In-plant inspection of fabrication/quality control procedures** or submit Certificate of Compliance	N	Submittal or Field Review; VCC 1704.2.5, 1704.2.5.1, 1705.5		
Metal plate connected wood /metal trusses spanning 60' or more	Review approved submittal and installation of restraint/bracing	N	Submittal & Field Review; VCC 1704.2.5, 1704.2.5.1, 1705.5, 1705.5.2		
Joist Hangers-Materials/Installation	Review manufacturer's material and test standards	N	Field Review; ASTM D 1761		
High-Load Diaphragms- Installation	Review submittal and as-built assemblies; Inspection of sheathing, framing size, nail and staple diameter and length, number of fastener lines, and fastener spacing	N	Submittal & Field Review; VCC 1705.5, 1705.5.1		
Wood Shear Walls - installation	Review nailing, bolting, anchoring, fastening, diaphragms, struts, braces, and hold downs when fasteners are ≤ 4" on-center	N	Field Review; VCC 1705.11.1		
MAIN WIND FORCE RESISTING	SYSTEM				
Wind requirements	Review of the system components and installation for wood construction, cold-formed steel light frame construction, components, and cladding	N	Submittal & Field Review; VCC 1609.1.2, 1704.6.2, 1705.11, 1709		
SEISMIC FORCE RESISTING SYS	STEM				
Seismic requirements	Review of the designated seismic systems and seismic force resistance systems.	N	Submittal & Field Review; VCC 1613, 1704.6.1, 1705.12, 1705.13; ASCE 7		

MATERIAL/ACTIVITY	TYPE OF INSPECTION	APPLICABLE TO THIS PROJECT				
		Y/N/P/C	EXTENT/REFERENCE	AGENT	COMPLETED	
SMOKE CONTROL		ľ		•		
Special inspection of smoke	Leakage testing and recording of device location	n, N	Field Review; VCC 1705.18,			
control systems	pressure difference testing, flow measurement a	nd	1705.18.1, 1705.18.2			
	detection, and control verification					
SPRAYED FIRE RESISTIVE MAT	ERIAL, FIRE RESISTANT PENETRATIONS; JOI	NTS, MASTIC A	ND INTERMESCENT FIRE RESISTAN	IT COATING	6	
Structural member surface	Field review of surface conditions prior to application	ation N	AWCI 12-B; VCC 1705.14,			
conditions			1705.14.1, 1705.14.2			
Application/thickness/density/	Field review of application operations, thickness	, and N	ASTM E605, AWCI 12-B; VCC			
bond strength	density		1705.14.1,1705.14.2, 1705.14.3,			
			1705.14.4, 1705.14.5, 1705.14.6			
Mastic & Intumescent Fire	Field review of application operations and thickn	ess N	AWCI 12-B; VCC 1705.15			
Resistant Coating						
EXTERIOR INSULATION AND FIN	NISH SYSTEMS					
Application	Field review of application/installation	N	ASTM E2570, VCC 1705.16			
SPECIAL CASES						
Retaining Walls	Field review of installation of pre-manufactured	N	Field Review; VCC 113.4, 1705.1.1			
_	structural components					
Sprinkler system	Field review of placement and anchorage	N	Field Review; VCC 903.3.1.1,			
hangers/supports			1705.1.1; NFPA 13: 9.2			
Alternative Materials & Systems	As requested by Building Official, review system	& N	VCC 113.4, 1705.1.1			
	installation					
INSPECTION AGENTS	FIRM		ADDRESS		TELEPHONE	
1. Special Inspector	Speight, Marshall & Francis, P.C.	1228 Perimeter	Parkway, Suite 201, VA Beach, VA 23	454 (75	7) 427-1020	
2. Materials and Testing Laborator	у					
3. Special Inspector Smoke Control	bl					
System						
4. (Additional Agents?)						

Note: \* The Qualifications of the Special Inspector and Testing Laboratories are subject to the Approval of the Building Official.

\*\* Inspection of quality control procedures required only if fabricator is not regularly inspected by an independent inspection agency.

\*\*\* For construction projects in seismic regions, the Schedule of Special Inspections shall be expanded to include Architectural, Mechanical, and Electric components, as well as Storage Racks and Isolation Systems. Items in VCC Section 1705.12

#### SECTION 014200 - REFERENCES

#### PART 1 - GENERAL

#### 1.1 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": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- 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.

#### 1.2 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.
  - 1. For standards referenced by applicable building codes, comply with dates of standards as listed in building codes.

- 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.

#### 1.3 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. Abbreviations and acronyms not included in this list 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." The information in this list is subject to change and is believed to be accurate as of the date of the Contract Documents.
  - 1. AABC Associated Air Balance Council; <u>www.aabc.com</u>.
  - 2. AAMA American Architectural Manufacturers Association; (See FGIA).
  - 3. AAPFCO Association of American Plant Food Control Officials; <u>www.aapfco.org</u>.
  - 4. AASHTO American Association of State Highway and Transportation Officials; www.transportation.org.
  - 5. AATCC American Association of Textile Chemists and Colorists; <u>www.aatcc.org</u>.
  - 6. ABMA American Bearing Manufacturers Association; www.americanbearings.org.
  - 7. ABMA American Boiler Manufacturers Association; <u>www.abma.com</u>.
  - 8. ACI American Concrete Institute; (Formerly: ACI International); www.concrete.org.
  - 9. ACPA American Concrete Pipe Association; <u>www.concrete-pipe.org</u>.
  - 10. AEIC Association of Edison Illuminating Companies, Inc. (The); <u>www.aeic.org</u>.
  - 11. AF&PA American Forest & Paper Association; <u>www.afandpa.org</u>.
  - 12. AGA American Gas Association; <u>www.aga.org</u>.
  - 13. AHAM Association of Home Appliance Manufacturers; <u>www.aham.org</u>.
  - 14. AHRI Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
  - 15. AI Asphalt Institute; <u>www.asphaltinstitute.org</u>.
  - 16. AIA American Institute of Architects (The); www.aia.org.
  - 17. AISC American Institute of Steel Construction; <u>www.aisc.org</u>.
  - 18. AISI American Iron and Steel Institute; <u>www.steel.org</u>.
  - 19. AITC American Institute of Timber Construction; <u>www.plib.org</u>.
  - 20. AMCA Air Movement and Control Association International, Inc.; <u>www.amca.org</u>.
  - 21. ANSI American National Standards Institute; <u>www.ansi.org</u>.
  - 22. AOSA Association of Official Seed Analysts, Inc.; <u>www.aosaseed.com</u>.
  - 23. APA APA The Engineered Wood Association; <u>www.apawood.org</u>.
  - 24. APA Architectural Precast Association; <u>www.archprecast.org</u>.
  - 25. API American Petroleum Institute; <u>www.api.org</u>.
  - 26. ARI Air-Conditioning & Refrigeration Institute; (See AHRI).

- 27. ARI American Refrigeration Institute; (See AHRI).
- 28. ARMA Asphalt Roofing Manufacturers Association; <u>www.asphaltroofing.org</u>.
- 29. ASCE American Society of Civil Engineers; <u>www.asce.org</u>.
- 30. ASCE/SEI American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
- 31. ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers; <u>www.ashrae.org</u>.
- 32. ASME ASME International; (American Society of Mechanical Engineers); www.asme.org.
- 33. ASSE American Society of Sanitary Engineering; www.asse-plumbing.org.
- 34. ASSP American Society of Safety Professionals (The); <u>www.assp.org</u>.
- 35. ASTM ASTM International; <u>www.astm.org</u>.
- 36. ATIS Alliance for Telecommunications Industry Solutions; <u>www.atis.org</u>.
- 37. AVIXA Audiovisual and Integrated Experience Association; (Formerly: Infocomm International); <u>www.avixa.org</u>.
- 38. AWEA American Wind Energy Association; <u>www.awea.org</u>.
- 39. AWI Architectural Woodwork Institute; <u>www.awinet.org</u>.
- 40. AWMAC Architectural Woodwork Manufacturers Association of Canada; <u>www.awmac.com</u>.
- 41. AWPA American Wood Protection Association; <u>www.awpa.com</u>.
- 42. AWS American Welding Society; <u>www.aws.org</u>.
- 43. AWWA American Water Works Association; <u>www.awwa.org</u>.
- 44. BHMA Builders Hardware Manufacturers Association; www.buildershardware.com.
- 45. BIA Brick Industry Association (The); <u>www.gobrick.com</u>.
- 46. BICSI BICSI, Inc.; <u>www.bicsi.org</u>.
- 47. BIFMA BIFMA International; (Business and Institutional Furniture Manufacturer's Association); <u>www.bifma.org</u>.
- 48. BISSC Baking Industry Sanitation Standards Committee; www.bissc.org.
- 49. BWF Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
- 50. CDA Copper Development Association; <u>www.copper.org</u>.
- 51. CE Conformite Europeenne; <u>www.ec.europa.eu/growth/single-market/ce-marking</u>.
- 52. CEA Canadian Electricity Association; <u>www.electricity.ca</u>.
- 53. CFFA Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
- 54. CFSEI Cold-Formed Steel Engineers Institute; <u>www.cfsei.org</u>.
- 55. CGA Compressed Gas Association; <u>www.cganet.com</u>.
- 56. CIMA Cellulose Insulation Manufacturers Association; <u>www.cellulose.org</u>.
- 57. CISCA Ceilings & Interior Systems Construction Association; <u>www.cisca.org</u>.
- 58. CISPI Cast Iron Soil Pipe Institute; <u>www.cispi.org</u>.
- 59. CLFMI Chain Link Fence Manufacturers Institute; <u>www.chainlinkinfo.org</u>.
- 60. CPA Composite Panel Association; <u>www.compositepanel.org</u>.
- 61. CRI Carpet and Rug Institute (The); <u>www.carpet-rug.org</u>.
- 62. CRRC Cool Roof Rating Council; <u>www.coolroofs.org</u>.
- 63. CRSI Concrete Reinforcing Steel Institute; <u>www.crsi.org</u>.
- 64. CSA CSA Group; <u>www.csa-group.org</u>.
- 65. CSI Cast Stone Institute; www.caststone.org.
- 66. CSI Construction Specifications Institute (The); <u>www.csiresources.org</u>.
- 67. CSSB Cedar Shake & Shingle Bureau; <u>www.cedarbureau.org</u>.
- 68. CTA Consumer Technology Association; <u>www.cta.tech</u>.

REFERENCES

- 69. CTI Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.coolingtechnology.org.
- 70. CWC Composite Wood Council; (See CPA).
- 71. DASMA Door and Access Systems Manufacturers Association; <u>www.dasma.com</u>.
- 72. DHA Decorative Hardwoods Association; (Formerly: Hardwood Plywood & Veneer Association); www.decorativehardwoods.org.
- 73. DHI Door and Hardware Institute; <u>www.dhi.org</u>.
- 74. ECA Electronic Components Association; (See ECIA).
- 75. ECAMA Electronic Components Assemblies & Materials Association; (See ECIA).
- 76. ECIA Electronic Components Industry Association; <u>www.ecianow.org</u>.
- 77. EIA Electronic Industries Alliance; (See TIA).
- 78. EIMA EIFS Industry Members Association; <u>www.eima.com</u>.
- 79. EJMA Expansion Joint Manufacturers Association, Inc.; <u>www.ejma.org</u>.
- 80. EOS/ESD Association; (Electrostatic Discharge Association); <u>www.esda.org</u>.
- 81. ESTA Entertainment Services and Technology Association; (See PLASA).
- 82. ETL Intertek (See Intertek); <u>www.intertek.com</u>.
- 83. EVO Efficiency Valuation Organization; <u>www.evo-world.org</u>.
- 84. FCI Fluid Controls Institute; <u>www.fluidcontrolsinstitute.org</u>.
- 85. FGIA Fenestration and Glazing Industry Alliance; <u>https://fgiaonline.org</u>.
- 86. FIBA Federation Internationale de Basketball; (The International Basketball Federation); <u>www.fiba.com</u>.
- 87. FIVB Federation Internationale de Volleyball; (The International Volleyball Federation); <u>www.fivb.org</u>.
- 88. FM Approvals FM Approvals LLC; <u>www.fmapprovals.com</u>.
- 89. FM Global FM Global; (Formerly: FMG FM Global); <u>www.fmglobal.com</u>.
- 90. FRSA Florida Roofing, Sheet Metal Contractors Association, Inc.; www.floridaroof.com.
- 91. FSA Fluid Sealing Association; <u>www.fluidsealing.com</u>.
- 92. FSC Forest Stewardship Council U.S.; <u>www.fscus.org</u>.
- 93. GA Gypsum Association; <u>www.gypsum.org</u>.
- 94. GANA Glass Association of North America; (See NGA).
- 95. GS Green Seal; <u>www.greenseal.org</u>.
- 96. HI Hydraulic Institute; <u>www.pumps.org</u>.
- 97. HI/GAMA Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
- 98. HMMA Hollow Metal Manufacturers Association; (See NAAMM).
- 99. HPVA Hardwood Plywood & Veneer Association; (See DHA).
- 100. IAPSC International Association of Professional Security Consultants; <u>www.iapsc.org</u>.
- 101. IAS International Accreditation Service; <u>www.iasonline.org</u>.
- 102. ICBO International Conference of Building Officials; (See ICC).
- 103. ICC International Code Council; <u>www.iccsafe.org</u>.
- 104. ICEA Insulated Cable Engineers Association, Inc.; <u>www.icea.net</u>.
- 105. ICPA International Cast Polymer Association; www.theicpa.com.
- 106. ICRI International Concrete Repair Institute, Inc.; www.icri.org.
- 107. IEC International Electrotechnical Commission; <u>www.iec.ch</u>.
- 108. IEEE Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
- 109. IES Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); <u>www.ies.org</u>.
- 110. IESNA Illuminating Engineering Society of North America; (See IES).
- 111. IEST Institute of Environmental Sciences and Technology; www.iest.org.

- 112. IGMA Insulating Glass Manufacturers Alliance; (See FGIA).
- 113. IGSHPA International Ground Source Heat Pump Association; www.igshpa.org.
- 114. II Infocomm International; (See AVIXA).
- 115. ILI Indiana Limestone Institute of America, Inc.; <u>www.iliai.com</u>.
- 116. Intertek Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
- 117. ISA International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); <u>www.isa.org</u>.
- 118. ISAS Instrumentation, Systems, and Automation Society (The); (See ISA).
- 119. ISFA International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); <u>www.isfanow.org</u>.
- 120. ISO International Organization for Standardization; www.iso.org.
- 121. ISSFA International Solid Surface Fabricators Association; (See ISFA).
- 122. ITU International Telecommunication Union; <u>www.itu.int</u>.
- 123. KCMA Kitchen Cabinet Manufacturers Association; www.kcma.org.
- 124. LMA Laminating Materials Association; (See CPA).
- 125. LPI Lightning Protection Institute; <u>www.lightning.org</u>.
- 126. MBMA Metal Building Manufacturers Association; www.mbma.com.
- 127. MCA Metal Construction Association; <u>www.metalconstruction.org</u>.
- 128. MFMA Maple Flooring Manufacturers Association, Inc.; <u>www.maplefloor.org</u>.
- 129. MFMA Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
- 130. MHI Material Handling Industry; <u>www.mhi.org</u>.
- 131. MIA Marble Institute of America; (See NSI).
- 132. MMPA Moulding & Millwork Producers Association; www.wmmpa.com.
- 133. MPI Master Painters Institute; <u>www.paintinfo.com</u>.
- 134. MSS Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
- 135. NAAMM National Association of Architectural Metal Manufacturers; www.naamm.org.
- 136. NACE NACE International; (National Association of Corrosion Engineers International); <u>www.nace.org</u>.
- 137. NADCA National Air Duct Cleaners Association; www.nadca.com.
- 138. NAIMA North American Insulation Manufacturers Association; www.naima.org.
- 139. NALP National Association of Landscape Professionals; <u>www.landscapeprofessionals.org</u>.
- 140. NBGQA National Building Granite Quarries Association, Inc.; <u>www.nbgqa.com</u>.
- 141. NBI New Buildings Institute; <u>www.newbuildings.org</u>.
- 142. NCAA National Collegiate Athletic Association (The); www.ncaa.org.
- 143. NCMA National Concrete Masonry Association; <u>www.ncma.org</u>.
- 144. NEBB National Environmental Balancing Bureau; <u>www.nebb.org</u>.
- 145. NECA National Electrical Contractors Association; www.necanet.org.
- 146. NeLMA Northeastern Lumber Manufacturers Association; <u>www.nelma.org</u>.
- 147. NEMA National Electrical Manufacturers Association; www.nema.org.
- 148. NETA InterNational Electrical Testing Association; www.netaworld.org.
- 149. NFHS National Federation of State High School Associations; www.nfhs.org.
- 150. NFPA National Fire Protection Association; <u>www.nfpa.org</u>.
- 151. NFPA NFPA International; (See NFPA).
- 152. NFRC National Fenestration Rating Council; <u>www.nfrc.org</u>.
- 153. NGA National Glass Association (The); (Formerly: Glass Association of North America); www.glass.org.
- 154. NHLA National Hardwood Lumber Association; www.nhla.com.

- 155. NLGA National Lumber Grades Authority; <u>www.nlga.org</u>.
- 156. NOFMA National Oak Flooring Manufacturers Association; (See NWFA).
- 157. NOMMA National Ornamental & Miscellaneous Metals Association; www.nomma.org.
- 158. NRCA National Roofing Contractors Association; www.nrca.net.
- 159. NRMCA National Ready Mixed Concrete Association; www.nrmca.org.
- 160. NSF NSF International; <u>www.nsf.org</u>.
- 161. NSI National Stone Institute; (Formerly: Marble Institute of America); www.naturalstoneinstitute.org.
- 162. NSPE National Society of Professional Engineers; www.nspe.org.
- 163. NSSGA National Stone, Sand & Gravel Association; <u>www.nssga.org</u>.
- 164. NTMA National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
- 165. NWFA National Wood Flooring Association; www.nwfa.org.
- 166. NWRA National Waste & Recycling Association; www.wasterecycling.org
- 167. PCI Precast/Prestressed Concrete Institute; <u>www.pci.org</u>.
- 168. PDI Plumbing & Drainage Institute; <u>www.pdionline.org</u>.
- 169. PLASA PLASA; (Formerly: ESTA Entertainment Services and Technology Association); www.plasa.org.
- 170. RCSC Research Council on Structural Connections; www.boltcouncil.org.
- 171. RFCI Resilient Floor Covering Institute; <u>www.rfci.com</u>.
- 172. RIS Redwood Inspection Service; www.redwoodinspection.com.
- 173. SAE SAE International; www.sae.org.
- 174. SCTE Society of Cable Telecommunications Engineers; <u>www.scte.org</u>.
- 175. SDI Steel Deck Institute; <u>www.sdi.org</u>.
- 176. SDI Steel Door Institute; <u>www.steeldoor.org</u>.
- 177. SEFA Scientific Equipment and Furniture Association (The); www.sefalabs.com.
- 178. SEI/ASCE Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
- 179. SIA Security Industry Association; www.siaonline.org.
- 180. SJI Steel Joist Institute; <u>www.steeljoist.org</u>.
- 181. SMA Screen Manufacturers Association; <u>www.smainfo.org</u>.
- 182. SMACNA Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
- 183. SMPTE Society of Motion Picture and Television Engineers; <u>www.smpte.org</u>.
- 184. SPFA Spray Polyurethane Foam Alliance; <u>www.sprayfoam.org</u>.
- 185. SPIB Southern Pine Inspection Bureau; <u>www.spib.org</u>.
- 186. SPRI Single Ply Roofing Industry; <u>www.spri.org</u>.
- 187. SRCC Solar Rating & Certification Corporation; www.solar-rating.org.
- 188. SSINA Specialty Steel Industry of North America; <u>www.ssina.com</u>.
- 189. SSPC SSPC: The Society for Protective Coatings; <u>www.sspc.org</u>.
- 190. STI Steel Tank Institute; <u>www.steeltank.com</u>.
- 191. SWI Steel Window Institute; <u>www.steelwindows.com</u>.
- 192. SWPA Submersible Wastewater Pump Association; www.swpa.org.
- 193. TCA Tilt-Up Concrete Association; <u>www.tilt-up.org</u>.
- 194. TCNA Tile Council of North America, Inc.; <u>www.tileusa.com</u>.
- 195. TEMA Tubular Exchanger Manufacturers Association, Inc.; <u>www.tema.org</u>.
- 196. TIA Telecommunications Industry Association (The); (Formerly: TIA/EIA Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
- 197. TIA/EIA Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).

- 198. TMS The Masonry Society; www.masonrysociety.org.
- 199. TPI Truss Plate Institute; www.tpinst.org.
- 200. TPI Turfgrass Producers International; <u>www.turfgrasssod.org</u>.
- 201. TRI Tile Roofing Institute; <u>www.tileroofing.org</u>.
- 202. UL Underwriters Laboratories Inc.; www.ul.com.
- 203. UL LLC UL LLC; <u>www.ul.com</u>.
- 204. UNI Uni-Bell PVC Pipe Association; <u>www.uni-bell.org</u>.
- 205. USAV USA Volleyball; <u>www.usavolleyball.org</u>.
- 206. USGBC U.S. Green Building Council; <u>www.usgbc.org</u>.
- 207. USITT United States Institute for Theatre Technology, Inc.; www.usitt.org.
- 208. WA Wallcoverings Association; www.wallcoverings.org.
- 209. WCLIB West Coast Lumber Inspection Bureau; www.wclib.org.
- 210. WCMA Window Covering Manufacturers Association; www.wcmanet.org.
- 211. WDMA Window & Door Manufacturers Association; www.wdma.com.
- 212. WI Woodwork Institute; www.wicnet.org.
- 213. WSRCA Western States Roofing Contractors Association; <u>www.wsrca.com</u>.
- 214. WWPA Western Wood Products Association; <u>www.wwpa.org</u>.
- 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. This information is believed to be accurate as of the date of the Contract Documents.
  - 1. DIN Deutsches Institut für Normung e.V.; <u>www.din.de</u>.
  - 2. IAPMO International Association of Plumbing and Mechanical Officials; <u>www.iapmo.org</u>.
  - 3. ICC International Code Council; <u>www.iccsafe.org</u>.
  - 4. ICC-ES ICC Evaluation Service, LLC; <u>www.icc-es.org</u>.
- 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. Information is subject to change and is up to date as of the date of the Contract Documents.
  - 1. COE Army Corps of Engineers; <u>www.usace.army.mil</u>.
  - 2. CPSC Consumer Product Safety Commission; <u>www.cpsc.gov</u>.
  - 3. DOC Department of Commerce; National Institute of Standards and Technology; <u>www.nist.gov</u>.
  - 4. DOD Department of Defense; <u>www.quicksearch.dla.mil</u>.
  - 5. DOE Department of Energy; <u>www.energy.gov</u>.
  - 6. EPA Environmental Protection Agency; <u>www.epa.gov</u>.
  - 7. FAA Federal Aviation Administration; <u>www.faa.gov</u>.
  - 8. FG Federal Government Publications; <u>www.gpo.gov/fdsys</u>.
  - 9. GSA General Services Administration; <u>www.gsa.gov</u>.
  - 10. HUD Department of Housing and Urban Development; <u>www.hud.gov</u>.
  - 11. LBL Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; <u>www.eetd.lbl.gov</u>.
  - 12. OSHA Occupational Safety & Health Administration; www.osha.gov.
  - 13. SD Department of State; <u>www.state.gov</u>.
  - 14. TRB Transportation Research Board; National Cooperative Highway Research Program; The National Academies; <u>www.trb.org</u>.

- 15. USDA Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; <u>www.ars.usda.gov</u>.
- 16. USDA Department of Agriculture; Rural Utilities Service; <u>www.usda.gov</u>.
- 17. USDOJ Department of Justice; Office of Justice Programs; National Institute of Justice; <u>www.ojp.usdoj.gov</u>.
- 18. USP U.S. Pharmacopeial Convention; <u>www.usp.org</u>.
- 19. USPS United States Postal Service; <u>www.usps.com</u>.
- 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. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
  - 1. CFR Code of Federal Regulations; Available from Government Printing Office; www.govinfo.gov.
  - 2. DOD Department of Defense; Military Specifications and Standards; Available from DLA Document Services; <u>www.quicksearch.dla.mil</u>.
  - 3. DSCC Defense Supply Center Columbus; (See FS).
  - 4. FED-STD Federal Standard; (See FS).
  - 5. FS Federal Specification; Available from DLA Document Services; <u>www.quicksearch.dla.mil</u>.
    - a. Available from Defense Standardization Program; <u>www.dsp.dla.mil</u>.
    - b. Available from General Services Administration; <u>www.gsa.gov</u>.
    - c. Available from National Institute of Building Sciences/Whole Building Design Guide; <u>www.wbdg.org</u>.
  - 6. MILSPEC Military Specification and Standards; (See DOD).
  - 7. USAB United States Access Board; <u>www.access-board.gov</u>.
  - 8. USATBCB U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
- F. State 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. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
  - 1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; <u>www.bearhfti.ca.gov</u>.
  - 2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; <u>www.calregs.com</u>.
  - 3. CDHS; California Department of Health Services; (See CDPH).
  - 4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/Main-Page.aspx.
  - 5. CPUC; California Public Utilities Commission; <u>www.cpuc.ca.gov</u>.
  - 6. SCAQMD; South Coast Air Quality Management District; <u>www.aqmd.gov</u>.
  - 7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservice.tamu.edu.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

# SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

#### 1.2 USE CHARGES

- A. Installation, removal, and use charges for temporary facilities to be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

# 1.3 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.
- C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- D. Erosion and Sedimentation Control Plan: Show compliance with requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

E. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention
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program.

- F. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold. Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
  - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and requirements for replacing water-damaged Work.
  - 2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
  - 3. Indicate methods to be used to avoid trapping water in finished work.

### 1.4 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.

#### 1.5 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. Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts.
- B. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide concrete, or galvanized-steel bases for supporting posts.

#### 2.2 TEMPORARY FACILITIES

- A. Field Offices, General (for the Contractor): The owner will allow temporary use of the existing space to be renovated to serve as the field office. Prefabricated or mobile units with not be required. The contractor will provide all needs required to satisfy project requirements (i.e. phone service, table and chairs, etc.)
- B. 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, Cooling, and Dehumidifying 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.

### PART 3 - EXECUTION

### 3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
  - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

#### 3.2 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 011000 "Summary."

### TEMPORARY FACILITIES AND CONTROLS

# SPS INNOVATION CENTER Suffolk Public Schools

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.

### 3.3 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:
  - 1. Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash 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.
  - 1. Use of Permanent Toilets: Use of Owner's existing or new toilet facilities is not permitted.
- E. Temporary 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.
  - 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
- F. Electric Power Service:
  - 1. Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- G. 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.

- H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install WiFi cell phone access equipment, and one land-based telephone line(s) for each field office.
  - 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.
- I. Electronic Communication Service: Provide secure WiFi wireless connection to internet with provisions for access by Architect and Owner.

### 3.4 SUPPORT FACILITIES INSTALLATION

- A. Comply with the following:
  - 1. Utilize designated area within existing building for temporary field offices.
  - 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 Existing Permanent Roads and Paved Areas: Maintain existing roads and paved areas adequate for construction operations.
  - 1. Any damage during construction activities to existing facilities, concrete walks, drives or asphalt areas, etc. that are to remain, shall be repaired to a condition that's equal or better to its original condition without any additional cost to the Owner.
- D. Parking: Provide temporary parking areas for construction personnel.
- E. Storage and Staging: Use designated areas of Project site for storage and staging needs.

- 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.
  - 2. Remove snow and ice as required to minimize accumulations.
- G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
  - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
  - 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 touch up signs, so they are legible at all times.
- H. Waste Disposal Facilities:
  - 1. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
  - 2. 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 017300 "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.
- J. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

# 3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. 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 011000 "Summary."
- C. Temporary Erosion and Sedimentation Control:
  - 1. Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and

### TEMPORARY FACILITIES AND CONTROLS

airborne dust to undisturbed areas and to adjacent properties and walkways, in accordance with erosion- and sedimentation-control Drawings, requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

- a. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
- b. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- c. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
- d. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.
- D. 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.
- E. Tree and Plant Protection:
  - 1. 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.
- F. 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 materials approved by authorities having jurisdiction.
- G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- H. 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. Comply with additional limits on smoking specified in other Sections.
  - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with 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.

#### 3.6 MOISTURE AND MOLD CONTROL

- A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.
- B. Exposed Construction Period: 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 Period: 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 and replace stored or installed material that begins to grow mold.
  - 7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: 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 temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
  - 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 and require replacing.
    - 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 and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

#### 3.7 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 017700 "Closeout Procedures."

END OF SECTION 015000

#### SECTION 016000 - PRODUCT REQUIREMENTS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. The Work of This 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 011000 "Summary" for Contractor requirements related to Owner-furnished products.
  - 2. Section 012100 "Allowances" for products selected under an allowance.
  - 3. Section 012500 "Substitution Procedures" for requests for substitutions.
  - 4. Section 014200 "References" for applicable industry standards for products specified.
  - 5. Section 017700 "Closeout Procedures" for submitting warranties.

#### 1.2 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. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products unless otherwise indicated.
  - 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in "Comparable Products" Article, 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 single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
  - 1. Evaluating Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special
features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
  - 1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
  - 2. Data indicating compliance with the requirements specified in "Comparable Products" Article.
- E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 013300 "Submittal Procedures."
- F. Substitution: Refer to Section 012500 "Substitution Procedures" for definition and limitations on substitutions.

#### 1.3 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.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
  - 1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is inconspicuous.
  - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service- or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:
    - a. Name of product and manufacturer.
    - b. Model and serial number.
    - c. Capacity.
    - d. Speed.
    - e. Ratings.

3. See individual identification Sections in Divisions 21, 22, 23, and 26 for additional equipment identification requirements.

# 1.4 COORDINATION

A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

# 1.5 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 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 and with adequate protection from wind.
- 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.

## 1.6 **PRODUCT WARRANTIES**

A. Warranties specified in other Sections are to 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 standard warranty form furnished by individual manufacturer for a particular product and issued in the name of Owner or endorsed by manufacturer to Owner.
- 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of Owner or endorsed by manufacturer to 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 in the Project Manual, 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 017700 "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 meeting 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 Specifications establish salient characteristics of products.
  - 6. Or Equal: For products specified by name and accompanied by the term "or equal," "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
    - a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by Architect, whose determination is final.
- B. Product Selection Procedures:
  - 1. Limited List of Products: 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 unless otherwise indicated.

- a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."
- 2. Non-Limited List of Products: 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.
  - a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
  - b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.
- 3. Limited List of Manufacturers: 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 unless otherwise indicated.
  - a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."
- 4. Non-Limited List of Manufacturers: 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.
  - a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
  - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.
- 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 may additionally 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.
  - a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.
- C. Visual Matching Specification: Where Specifications require the phrase "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 012500 "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 a 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.
- E. Sustainable Product Selection: Where Specifications require product to meet sustainable product characteristics, select products complying with indicated requirements. Comply with requirements in Division 01 sustainability requirements Section and individual Specification Sections.

#### 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: 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 the following requirements:
  - 1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
  - 2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
  - 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.
- B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for a comparable product. Architect will notify Contractor of approval or rejection of proposed comparable product within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
  - 1. Architect's Approval of Submittal: Indication of approval in web-based Project management software . See Section 013300 "Submittal Procedures."
  - 2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- C. Submittal Requirements, Single-Step Process: When acceptable to Architect, incorporate specified submittal requirements of individual Specification Section in combined submittal for comparable products. Approval by Architect of Contractor's request for use of comparable product and of individual submittal requirements will also satisfy other submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

# SECTION 017300 - EXECUTION

## PART 1 - GENERAL

## 1.1 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.
  - 3. Installation.
  - 4. Cutting and patching.
  - 5. Coordination of Owner's portion of the Work.
  - 6. Progress cleaning.
  - 7. Starting and adjusting.
  - 8. Protection of installed construction.
  - 9. Correction of the Work.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for coordination of Owner-furnished products and limits on use of Project site.
  - 2. Section 013300 "Submittal Procedures" for submitting surveys.
  - 3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

#### 1.2 DEFINITIONS

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

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer.
- B. Certificates: Submit certificate signed by professional engineer, certifying that location and elevation of improvements comply with requirements.
- C. Cutting and Patching Plan: Submit plan describing procedures at least 10 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.

#### EXECUTION

- 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.

## 1.4 QUALITY ASSURANCE

- A. Professional Engineer Qualifications: Refer to Section 014000 "Quality Requirements."
- 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, or when encountering the need for cutting and patching of elements whose structural function is not known, 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 separation assemblies.
    - c. Air or smoke barriers.
    - d. Fire-suppression systems.
    - e. Plumbing piping systems.
    - f. Mechanical systems piping and ducts.
    - g. Control systems.
    - h. Communication systems.
    - i. Fire-detection and -alarm systems.
    - j. Conveying systems.
    - k. Electrical wiring systems.
    - l. 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. Exterior curtain-wall construction.
- d. Sprayed fire-resistive material.
- e. Equipment supports.
- f. Piping, ductwork, vessels, and equipment.
- g. 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. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

#### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Comply with requirements specified in other Sections.
  - 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.
- 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. Use materials that are not considered hazardous.
- C. 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.

# 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, mechanical and electrical systems, and other construction affecting the Work.

#### EXECUTION

- 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, 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, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.
  - 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, submit a request for information to Architect in accordance with requirements in Section 013100 "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 and existing conditions. If discrepancies are discovered, notify Architect promptly.
- B. Engage a professional engineer experienced in laying out the Work, using the following 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 INSTALLATION

- A. 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 96 inches in occupied spaces and 90 inches in unoccupied spaces, unless otherwise indicated on Drawings.
- 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 satisfactory results as judged by Architect. 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 of type expected for Project.
- 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: Select tools or equipment that minimize production of excessive 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 portions of the 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 with manufacturer.
  - 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, as judged by Architect. Fit exposed connections together to form hairline joints.

# 3.5 CUTTING AND PATCHING

- A. 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 in accordance with requirements in Section 011000 "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. 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. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  - 6. Proceed with patching after construction operations requiring cutting are complete.
- H. 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, as judged by Architect. 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 eliminate 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, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.
- 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an evenplane surface of uniform appearance.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

## 3.6 COORDINATION OF OWNER'S PORTION OF THE WORK

- A. Site Access: Provide access to Project site for Owner's construction personnel.
  - 1. Provide temporary facilities required for Owner-furnished, Contractor-installed products.
  - 2. Refer to Section 011000 "Summary" for other requirements for Owner-furnished, Contractor-installed products.
- 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 and Owner's separate contractors 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.

## 3.7 PROGRESS CLEANING

- A. 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 80 deg F.
  - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, in accordance with regulations.
    - a. Use containers intended for holding waste materials of type to be stored.

- 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 in accordance with 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: 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 015000 "Temporary Facilities and Controls."] [Section 017419 "Construction Waste Management and Disposal."]
- 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 ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

#### 3.8 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 019113 "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 014000 "Quality Requirements."

## 3.9 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. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- C. Comply with manufacturer's written instructions for temperature and relative humidity.

# 3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace damaged, defective, or nonconforming Work. Restore damaged substrates and finishes.
  - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.
- C. Restore permanent facilities used during construction to their specified condition.
- D. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- E. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- F. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017300

## SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

#### PART 1 - GENERAL

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. Salvaging nonhazardous demolition and construction waste.
  - 2. Recycling nonhazardous demolition and construction waste.
  - 3. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
  - 1. Section 042000 "Unit Masonry" for disposal requirements for masonry waste.

#### 1.3 DEFINITIONS

- A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.
- C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

#### 1.4 MATERIALS OWNERSHIP

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

- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
  - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

## 1.5 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: certified by EPA-approved certification program.
- B. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.

## 1.6 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
  - 1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
  - 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
  - 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
  - 4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
  - 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
  - 6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

#### 1.7 PERFORMANCE REQUIREMENTS

A. General: Maximize rates for salvage/recycling of total non-hazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the

Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:

- 1. Construction Waste:
  - a. Masonry and CMU.
  - b. Metals.
  - c. Roofing.
  - d. Insulation.
  - e. Gypsum board.
  - f. Piping.
  - g. Electrical conduit.
  - h. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
    - 1) Paper.
    - 2) Cardboard.
    - 3) Boxes.
    - 4) Plastic sheet and film.
    - 5) Polystyrene packaging.
    - 6) Wood crates.
    - 7) Wood pallets.
    - 8) Plastic pails.

## PART 2 - EXECUTION

## 2.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
  - 1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."

## 2.2 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
  - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
    - a. Inspect containers and bins for contamination and remove contaminated materials if found.
  - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
  - 4. Store components off the ground and protect from the weather.
  - 5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

# 2.3 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
  - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
  - 2. Polystyrene Packaging: Separate and bag materials.
  - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
  - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
  - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
  - 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
  - 1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.
- D. Paint: Seal containers and store by type.

## 2.4 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

- 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
- 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 017419

## SECTION 017700 - CLOSEOUT PROCEDURES

#### PART 1 - GENERAL

#### 1.1 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. List of incomplete items.
  - 4. Submittal of Project warranties.
  - 5. Final cleaning.
- B. Related Requirements:
  - 1. Section 012900 "Payment Procedures" for requirements for Applications for Payment for Substantial Completion and Final Completion.
  - 2. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
  - 3. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.

#### 1.2 DEFINITIONS

A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

# 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- 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.

# 1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items required by 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, 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 Owner. Label with manufacturer's name and model number.
    - 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 Owner's signature for receipt of submittals.
  - 5. Submit testing, adjusting, and balancing 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 017900 "Demonstration and Training."
  - 6. Advise Owner of changeover in utility services.

- 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.
- 10. Touch up paint 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. 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 in accordance with Section 012900 "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 will state that each item has been completed or otherwise resolved for acceptance.
- 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. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

#### 1.8 LIST OF INCOMPLETE ITEMS

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, listed by room or space number.
- 2. Organize items applying to each space by major element, including categories for ceilings, 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. MS Excel Electronic File: Architect will return annotated file.
  - b. PDF Electronic File: Architect will return annotated file.
  - c. Web-Based Project Software Upload: Utilize software feature for creating and updating list of incomplete items (punch list).

## 1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
  - 1. Submit to web-based project software site.
- D. Warranties in Paper Form:
  - 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 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.
- E. 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.

#### 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 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 not planted, mulched, or paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove snow and ice to provide safe access to building.
    - f. 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.
    - g. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - h. Clean flooring, removing debris, dirt, and staining; clean in accordance with manufacturer's instructions.
    - i. Vacuum and mop concrete.
    - j. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean in accordance with manufacturer's instructions if visible soil or stains remain.
    - k. 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.
    - 1. Remove labels that are not permanent.

- m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
- o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
- p. 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 ACR. Provide written report on completion of cleaning.
- q. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
- r. Leave Project clean and ready for occupancy.
- C. Construction Waste Disposal: Comply with waste-disposal requirements in Section 017419 "Construction Waste Management and Disposal."

#### 3.2 CORRECTION OF THE WORK

A. Complete repair and restoration operations required by "Correction of the Work" Article in Section 017300 "Execution" before requesting inspection for determination of Substantial Completion.

END OF SECTION 017700

## SECTION 017823 - 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 manuals.
  - 2. Emergency manuals.
  - 3. Systems and equipment operation manuals.
  - 4. Systems and equipment maintenance manuals.
  - 5. Product maintenance manuals.
- B. Related Requirements:
  - 1. Section 013300 "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. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
  - 1. Architect and will comment on whether content of operation and maintenance submittals is acceptable.
  - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation 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. Submit by uploading to web-based project software site. Enable reviewer comments on draft submittals.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect and Commissioning Authority 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 and Commissioning Authority's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's and Commissioning Authority's comments and prior to commencing demonstration and training.
- E. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

## 1.5 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. 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: Bookmark 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.

# 1.6 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization of Manuals: 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 Architect.
  - 7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
  - 8. 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. 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."

## 1.7 EMERGENCY MANUALS

- A. 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.
- B. Content: Organize manual into a separate section for each of the following:
  - 1. Type of emergency.
  - 2. Emergency instructions.
  - 3. Emergency procedures.
- C. 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.
- D. 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.
- E. 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.

## 1.8 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
  - 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.
- B. 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.
- C. 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.
- D. 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.
- E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

## 1.9 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.
  - 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.
- B. 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 warranties and bonds as described below.
- C. 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.

- D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
  - 1. Standard maintenance instructions and bulletins; 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.
    - a. 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.
  - 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.
- E. 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.
- F. 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.
- G. 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.
- H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- I. 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.

- J. 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 maintenance manuals.

#### 1.10 PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. 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.
- C. 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.
- D. 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.
- E. 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.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. 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 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823

# SECTION 017839 - 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. Miscellaneous record submittals.
- B. Related Requirements:
  - 1. Section 017700 "Closeout Procedures" for general closeout procedures.
  - 2. Section 017823 "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 PDF electronic files of scanned record prints and one set(s) of file 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(s) of file prints.
      - 2) Print each drawing, whether or not changes and additional information were recorded.
- B. Reports: Submit written report biweekly indicating items incorporated into Project Record Documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.
### 1.4 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 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.
    - 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] [Work] Change Directive.
    - k. Changes made following Architect's written orders.
    - 1. 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 prints 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. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
  - 1. Format: Annotated PDF electronic file with comment function enabled.
  - 2. Identification: As follows:

- a. Project name.
- b. Date.
- c. Designation "PROJECT RECORD DRAWINGS."
- d. Name of Architect.
- e. Name of Contractor.

### 1.5 RECORD PRODUCT DATA

- 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. 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 and Record Drawings where applicable.
- C. Format: Submit Record Product Data as annotated PDF electronic file.
  - 1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

### 1.6 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store Record Documents 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.

### PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017839

# SECTION 024119 - SELECTIVE 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 selected portions of building or structure.
  - 2. Salvage of existing items to be reused or recycled.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
  - 2. Section 017300 "Execution" for cutting and patching procedures.

#### 1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and [deliver to Owner ready for reuse] [store].
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

## 1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of

interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

### 1.5 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project Site.
  - 1. Inspect and discuss condition of construction to be selectively demolished.
  - 2. Review structural load limitations of existing structure.
  - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
  - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
  - 5. Review areas where existing construction is to remain and requires protection.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Schedule of Selective Demolition Activities: Indicate the following:
  - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's building manager's and on-site operations are uninterrupted.
  - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
  - 3. Coordination for shutoff, capping, and continuation of utility services.
  - 4. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- B. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations.
- C. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

#### 1.7 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

#### 1.8 FIELD CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

- C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
  - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- D. Storage or sale of removed items or materials on-site is not permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  - 1. Maintain fire-protection facilities in service during selective demolition operations.

#### 1.9 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

#### 1.10 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

# PART 3 - EXECUTION

#### 3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
  - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

### 3.2 PREPARATION

A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

# 3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
  - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
  - 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
    - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

# 3.4 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
  - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
  - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
  - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
  - 1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

### 3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
  - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  - 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
  - 4. Maintain fire watch during and for at least <Insert number> hours after flamecutting operations.
  - 5. Maintain adequate ventilation when using cutting torches.
  - 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.

- 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
- 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- 9. Dispose of demolished items and materials promptly. Comply with requirements in Section 017419 "Construction Waste Management and Disposal."
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
  - 1. Clean salvaged items.
  - 2. Pack or crate items after cleaning. Identify contents of containers.
  - 3. Store items in a secure area until delivery to Owner.
  - 4. Transport items to Owner's storage area designated by Owner.
  - 5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:
  - 1. Clean and repair items to functional condition adequate for intended reuse.
  - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
  - 3. Protect items from damage during transport and storage.
  - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

### 3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- D. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

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## 3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPAapproved construction and demolition waste 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.
  - 3. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

### 3.8 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

## SECTION 03 20 00 - CONCRETE REINFORCING

### PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section Includes:
  - 1. Steel reinforcement bars.

### 1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

### 1.3 ACTION SUBMITTALS

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

#### 1.4 INFORMATIONAL SUBMITTALS

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

# PART 2 - PRODUCTS

### 2.1 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60.
- B. Fiber Reinforcing: Synthetic ASTM C1116, TYPE III

#### 2.2 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
  - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
- B. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch in diameter.

### 2.3 FABRICATING REINFORCEMENT

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

### PART 3 - EXECUTION

### 3.1 PREPARATION

A. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

#### 3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
  - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
  - 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.

- D. Provide concrete coverage in accordance with ACI 318.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.

### 3.3 JOINTS

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

# 3.4 INSTALLATION TOLERANCES

A. Comply with ACI 117.

# END OF SECTION 032000

## SECTION 033000 - CAST-IN-PLACE CONCRETE

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.
- B. Related Requirements:
  - 1. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and fiber reinforcement.

#### 1.2 DEFINITIONS

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

#### 1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each of the following.
  - 1. Portland cement.
  - 2. Fly ash.
  - 3. Slag cement.
  - 4. Aggregates.
  - 5. Admixtures:
    - a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
- B. Design Mixtures: For each concrete mixture, include the following:

- 1. Mixture identification.
- 2. Minimum 28-day compressive strength.
- 3. Durability exposure class.
- 4. Maximum w/cm.
- 5. Calculated equilibrium unit weight, for lightweight concrete.
- 6. Slump limit.
- 7. Air content.
- 8. Nominal maximum aggregate size.
- 9. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
- 10. Intended placement method.
- 11. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Shop Drawings:
  - 1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
    - a. Location of construction joints is subject to approval of the Architect.

### 1.5 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each of the following, signed by manufacturers:
  - 1. Cementitious materials.
  - 2. Admixtures.
- B. Material Test Reports: For the following, from a qualified testing agency:
  - 1. Portland cement.
  - 2. Fly ash.
  - 3. Slag cement.
  - 4. Aggregates.
  - 5. Admixtures:
- C. Research Reports: For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.
- D. Preconstruction Test Reports: For each mix design.
- E. Field quality-control reports.
- F. Minutes of preinstallation conference.

#### 1.6 QUALITY ASSURANCE

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

### 1.7 PRECONSTRUCTION TESTING

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

### 1.8 DELIVERY, STORAGE, AND HANDLING

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

#### 1.9 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1.
- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1.

#### PART 2 - PRODUCTS

#### 2.1 CONCRETE, GENERAL

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

## 2.2 CONCRETE MATERIALS

- A. Cementitious Materials:
  - 1. Portland Cement: ASTM C150/C150M, Type I or Type II.
  - 2. Fly Ash: ASTM C618, Class C or F.

### CAST-IN-PLACE CONCRETE

- 3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C33/C33M, coarse aggregate or better, graded. Provide aggregates from a single source.
  - 1. Alkali-Silica Reaction: Comply with one of the following:
    - a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.
    - b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.
    - c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. for moderately reactive aggregate or 3 lb./cu. yd. for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301.
  - 2. Maximum Coarse-Aggregate Size: 1 inch nominal.
  - 3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
  - 2. Retarding Admixture: ASTM C494/C494M, Type B.
  - 3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
  - 4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
  - 5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
  - 6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
- D. Water and Water Used to Make Ice: ASTM C94/C94M, potable.

# 2.3 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- B. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
  - 1. Color:
    - a. Ambient Temperature Below 50 deg F: Black.
    - b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
    - c. Ambient Temperature Above 85 deg F: White.
- C. Water: Potable or complying with ASTM C1602/C1602M.

### 2.4 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
  - 1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
  - 1. Fly Ash or Other Pozzolans: 25 percent by mass.
  - 2. Slag Cement: 40 percent by mass.
  - 3. Total of Fly Ash or Other Pozzolans, Slag Cement: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass.
  - 4. Total of Fly Ash or Other Pozzolans: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
  - 1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
  - 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  - 3. Use water-reducing admixture in pumped concrete.

#### 2.5 CONCRETE MIXTURES

- A. Normal-weight concrete used for slabs-on-grade.
  - 1. Minimum Compressive Strength: 3,500 psi at 28 days.
  - 2. Slump Limit: 4 inches, plus or minus 1 inch or 8 inches, plus or minus 1 inch for concrete with verified slump of 3 inches plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site.
  - 3. Air Content at exterior slabs only:
    - a. 5.0 percent, plus or minus 1.5 percent at point of delivery
  - 4. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.

### 2.6 CONCRETE MIXING

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

### PART 3 - EXECUTION

## 3.1 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
  - 1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.

#### 3.2 JOINTS

A. Construct joints true to line, with faces perpendicular to surface plane of concrete.

#### 3.3 CONCRETE PLACEMENT

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

- a. Do not use vibrators to transport concrete inside forms.
- b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
- c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
- d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

### 3.4 CONCRETE CURING

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

### 3.5 TOLERANCES

A. Conform to ACI 117.

### 3.6 CONCRETE SURFACE REPAIRS

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

- 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.
  - a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
  - b. Compact mortar in place and strike off slightly higher than surrounding surface.
- 3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces:
  - 1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
    - a. Correct low and high areas.
    - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
  - 2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  - 3. After concrete has cured at least 14 days, correct high areas by grinding.
  - 4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
    - a. Finish repaired areas to blend into adjacent concrete.
  - 5. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.
    - a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around.
    - b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
    - c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
    - d. Place, compact, and finish to blend with adjacent finished concrete.
    - e. Cure in same manner as adjacent concrete.
  - 6. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.
    - a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
    - b. Dampen cleaned concrete surfaces and apply bonding agent.
    - c. Place patching mortar before bonding agent has dried.
    - d. Compact patching mortar and finish to match adjacent concrete.
    - e. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

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

# 3.7 FIELD QUALITY CONTROL

- A. Contractor Quality Control: Contractor must conduct field observations and confirm concrete is placed in accordance with the contract documents for the following:
  - 1. Verification of use of required design mixture.
  - 2. Concrete placement, including conveying and depositing.
  - 3. Curing procedures and maintenance of curing temperature.
- B. Contractor must correct deficiencies in the work.

# 3.8 PROTECTION

- A. Protect concrete surfaces as follows:
  - 1. Protect from petroleum stains.
  - 2. Diaper hydraulic equipment used over concrete surfaces.
  - 3. Prohibit use of pipe-cutting machinery over concrete surfaces.
  - 4. Prohibit placement of steel items on concrete surfaces.
  - 5. Prohibit use of acids or acidic detergents over concrete surfaces.

# END OF SECTION 033000

SECTION 042000 – UNIT MASONRY

## PART 1 - GENERAL

# 1.1 SUMMARY

- A. Section Includes:
  - 1. Face Brick.
  - 2. Mortar and grout materials.
  - 3. Reinforcement.
  - 4. Ties and anchors.
  - 5. Embedded flashing.
  - 6. Accessories.
  - 7. Mortar and grout mixes.
- B. Products Installed but not Furnished under This Section:
  - 1. Steel lintels in unit masonry.
  - 2. Steel shelf angles for supporting unit masonry.
- C. Related Requirements:
  - 1. Section 072100 "Thermal Insulation" for cavity wall insulation.

# 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:
  - 1. Masonry Units: Indicate sizes, profiles, coursing, and locations of special shapes.
  - 2. Reinforcing Steel: Indicate bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315R.
  - 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Initial Selection:
  - 1. Face brick, in the form of straps of five or more bricks.
  - 2. Colored mortar.
  - 3. Weep/cavity vents.
- D. Samples for Verification: For each type and color of the following:
  - 1. Face brick, in the form of straps of five or more bricks.
  - 2. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.
  - 3. Weep/cavity vents.
  - 4. Accessories embedded in masonry.
- E. Delegated Design Submittals: For masonry anchors and ties, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
  - 1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- B. Material Certificates: For each type of the following:
  - 1. Masonry units.
    - a. Include material test reports substantiating compliance with requirements.
    - b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
    - c. For exposed brick, include test report for efflorescence in accordance with ASTM C67/C67M.
    - d. For surface-coated brick, include test report for durability of surface appearance after 50 cycles of freezing and thawing in accordance with ASTM C67/C67M or a list of addresses of buildings in Project's area where proposed brick has been used successfully and with a history of durability.
  - 2. Cementitious materials. Include name of manufacturer, brand name, and type.
  - 3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
  - 4. Grout mixes. Include description of type and proportions of ingredients.
  - 5. Reinforcing bars.
  - 6. Joint reinforcement.
  - 7. Anchors, ties, and metal accessories.
- C. 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 in accordance with ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
  - 2. Include test reports, in accordance with ASTM C1019, for grout mixes required to comply with compressive strength requirement.
- D. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

#### 1.4 QUALITY ASSURANCE

A. Qualifications:

- 1. Installers: All masonry flashing installers must complete the International Masonry Institute Flashing Upgrade training course.
- 2. Delegated Design Engineer: A professional engineer who is legally qualified to practice in Virginia where Project is located and who is experienced in providing engineering services of the type indicated.
- 3. Testing Agency Qualifications: Qualified in accordance with ASTM C1093 for testing indicated.

# 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

### 1.6 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  - 1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
  - 2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe, and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over 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 the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. 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 TMS 602.
  - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602.

# PART 2 - PRODUCTS

### 2.1 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
  - 1. Where fire-resistance-rated construction is indicated, use the equivalent thickness method for masonry units in accordance with ACI 216.1.

### 2.2 BRICK

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
  - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
  - 2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels, requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing where shapes produced by sawing would result in sawed surfaces being exposed to view.
- B. Face Brick 1 (Match original Existing): Facing brick complying with ASTM C216
  - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:

- a. <u>Acme Brick Company</u>.
- b. <u>Belden Brick Company (The)</u>.
- c. Boral Bricks, Inc; Boral Limited.
- d. <u>Endicott Clay Products Co</u>.
- e. <u>General Shale Brick</u>.
- f. <u>Glen-Gery Corporation</u>.
- g. Pre-Approved Equal
- 2. Grade: SW
- 3. Type: FBX
- 4. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested in accordance with ASTM C67/C67M.
- 5. Efflorescence: Provide brick that has been tested in accordance with ASTM C67/C67M and is rated "not effloresced."
- 6. Surface Coating: Brick with colors or textures produced by application of coatings withstand 50 cycles of freezing and thawing in accordance with ASTM C67/C67M with no observable difference in the applied finish when viewed from 10 ft. or have a history of successful use in Project's area.
- 7. Size (Actual Dimensions): Field verify and match size of existing.
- 8. provide face brick matching color range, texture, and size of existing adjacent brickwork.

# 2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, 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.
  - 1. Alkali content will not be more than 0.1 percent when tested in accordance with ASTM C114.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C91/C91M.
  - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
    - a. <u>Argos USA LLC</u>.
    - b. <u>Cemex S.A.B. de C.V</u>.
    - c. <u>Fairborn Cement Company</u>.
    - d. <u>Federal White Cement, Ltd</u>.
    - e. <u>Holcim (US) Inc</u>.
    - f. <u>Lafarge North America Inc</u>.
    - g. <u>Lehigh Hanson; HeidelbergCement Group</u>.
    - h. Lehigh White Cement Company.
    - i. <u>QUIKRETE</u>.
    - j. <u>SAKRETE of North America LLC</u>.

- E. Mortar Cement: ASTM C1329/C1329M.
  - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by the following:
    - a. <u>Lafarge North America Inc</u>.
- F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.
  - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
    - a. <u>Davis Colors</u>.
    - b. Euclid Chemical Company (The); an RPM company.
    - c. <u>Lanxess Corporation</u>.
    - d. <u>Solomon Colors Inc</u>.
- G. Colored Cement Products: Packaged blend made from portland cement and hydrated lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.
  - 1. Colored Portland Cement-Lime Mix:
    - a. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
      - 1) <u>Argos USA LLC</u>.
      - 2) <u>Holcim (US) Inc</u>.
      - 3) <u>Lehigh Hanson; HeidelbergCement Group</u>.
  - 2. Colored Masonry Cement:
    - a. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
      - 1) Argos USA LLC.
      - 2) <u>Cemex S.A.B. de C.V</u>.
      - 3) <u>Fairborn Cement Company</u>.
      - 4) <u>Holcim (US) Inc</u>.
      - 5) <u>Lafarge North America Inc</u>.
      - 6) <u>Lehigh Hanson; HeidelbergCement Group</u>.
  - 3. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
  - 4. Pigments do not exceed 10 percent of portland cement by weight.
  - 5. Pigments do not exceed 5 percent of [masonry cement] [or] [mortar cement] by weight.
- H. Aggregate for Mortar: ASTM C144.

- 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
- 2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
- 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
- 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- I. Aggregate for Grout: ASTM C404.
- J. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
  - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
    - a. <u>Euclid Chemical Company (The); an RPM company</u>.
    - b. <u>GCP Applied Technologies Inc</u>.
- K. Water: Potable.

# 2.4 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60.
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
  - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
    - a. <u>Heckmann Building Products, Inc</u>.
    - b. <u>Hohmann & Barnard, Inc</u>.
    - c. <u>Wire-Bond</u>.
- C. Masonry-Joint Reinforcement, General: ASTM A951/A951M.
  - 1. Interior Walls: Hot-dip galvanized, carbon steel.
  - 2. Exterior Walls: Hot-dip galvanized, carbon steel.
  - 3. Wire Size for Side Rods: 0.148-inch diameter.
  - 4. Wire Size for Cross Rods: 0.148-inch diameter.
  - 5. Wire Size for Veneer Ties: 0.148-inch diameter.
  - 6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
  - 7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.
- D. Masonry-Joint Reinforcement for Single-Wythe Masonry: either Ladder or truss type with single pair of side rods.

- 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
  - a. <u>Hohmann & Barnard, Inc</u>.
  - b. <u>Wire-Bond</u>.

### 2.5 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
  - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.
  - 2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008, Commercial Steel, with ASTM A 153, Class B coating.
  - 3. Steel Plates, Shapes, and Bars: ASTM A 36.
- B. Corrugated Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 7.6 to 12.7 mm and an amplitude of 0.06 to 0.10 inch made from 0.060-inch- thick, steel sheet, galvanized after fabrication.
- C. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.
- D. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.
  - 1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long may be used for masonry constructed from solid units.
  - 2. Where wythes are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.
  - 3. Wire: Fabricate from 3/16-inch- diameter, hot-dip galvanized steel wire.
- E. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
  - 1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- diameter, hotdip galvanized steel wire.
  - 2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.187-inch- diameter, hot-dip galvanized steel wire.
- F. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.
  - 1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153.
- G. Adjustable Masonry-Veneer Anchors:

- 1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
  - a. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.
- 2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.075inch- thick steel sheet, galvanized after fabrication.
- 3. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.187-inch- diameter, hot-dip galvanized-steel wire unless otherwise indicated.
- 4. Contractor's Option: Unless otherwise indicated, provide any of the following types of anchors:
- 5. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
  - a. <u>Products</u>: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - 1) <u>Dayton Superior Corporation, Dur-O-Wal Division</u>; D/A 213 or D/A 210 with D/A 700-708.
    - 2) <u>Heckmann Building Products Inc.</u>; 315-D with 316 or Pos-I-Tie.
    - 3) Hohmann & Barnard, Inc.; DW-10, DW-10HS or DW-10-X.
    - 4) <u>Wire-Bond</u>; 1004, Type III, RJ-711 or SureTie.
  - b. Fabricate sheet metal anchor sections and other sheet metal parts from 1.05-inch- thick, steel sheet, galvanized after fabrication.
  - c. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.187-inch- diameter, hot-dip galvanized steel wire.
- 6. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours per ASTM B 117.
  - a. <u>Products</u>: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - 1) <u>ITW Buildex;</u> Teks Maxiseal with Climaseal finish.
    - 2) <u>Textron Inc.</u>, Textron Fastening Systems; Elco Dril-Flex with Stalgard finish.

# 2.6 MISCELLANEOUS ANCHORS

- A. Anchor Bolts: Headed or L-shaped steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153, Class C; of dimensions indicated.
- B. Postinstalled Anchors: Torque-controlled expansion anchors or chemical anchors.
  - 1. Load Capacity: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

- 2. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 unless otherwise indicated.
- 3. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

# 2.7 EMBEDDED FLASHING

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
  - 1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.016 inch thick.
  - 2. Fabricate continuous flashings in sections 96 inches (2438 mm) long minimum, but not exceeding 12 ft. (3.7 m). Provide splice plates at joints of formed, smooth metal flashing.
  - 3. Fabricate through-wall metal flashing embedded in masonry from stainless steel, with sawtooth ribs at 3-inch (76-mm) 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) Hohmann & Barnard, Inc.
      - 3) Keystone Flashing Company, Inc.
  - 4. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
  - 5. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
  - 6. Solder metal items at corners.
- B. Flexible Flashing: Use one of the following unless otherwise indicated:
  - 1. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester-reinforced ethylene interpolymer alloy.
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) Hohmann & Barnard, Inc.
      - 2) Hyload, Inc.
      - 3) Mortar Net Solutions.
      - 4) Wire-Bond.
    - b. Monolithic Sheet: Elastomeric thermoplastic flashing, 40 mil (1.0 mm) thick.
    - c. Self-Adhesive Sheet: Elastomeric thermoplastic flashing, 25 mil (0.64 mm) thick, with a 15-mil- (0.38-mm-) thick coating of adhesive.
      - 1) Color: Gray

- d. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
- C. Solder and Sealants for Sheet Metal Flashings:
  - 1. Solder for Stainless Steel: ASTM B32, Grade Sn60 with acid flux of type recommended by stainless steel sheet manufacturer.
  - 2. Elastomeric Sealant: ASTM C920, chemically curing silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and remain watertight.
- D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

### 2.8 ACCESSORIES

1

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene or PVC.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Weep/Vent Products: Use the following unless otherwise indicated:
  - Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe; in color selected from manufacturer's standard.
    - a. <u>Products</u>: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Mortar Net USA, Ltd.; Mortar Net Weep Vents.
- E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
  - 1. <u>Products</u>: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. <u>Advanced Building Products Inc.</u>; Mortar Break.
    - b. <u>Mortar Net USA, Ltd.</u>; Mortar Net.
  - 2. Provide one of the following configurations:
    - a. Strips, full-depth of cavity and 10 inches high, with dovetail shaped notches 7 inches deep that prevent clogging with mortar droppings.
    - b. Strips, not less than 3/4 inch thick and 10 inches high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.

- F. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
  - 1. <u>Products</u>: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. <u>Dayton Superior Corporation, Dur-O-Wal Division</u>; D/A 810, D/A 812 or D/A 817.
    - b. <u>Heckmann Building Products Inc.</u>; No. 376 Rebar Positioner.
    - c. <u>Hohmann & Barnard, Inc.</u>; #RB or #RB-Twin Rebar Positioner.
    - d. <u>Wire-Bond</u>; O-Ring or Double O-Ring Rebar Positioner.

### 2.9 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 non load bearing use Masonry Cement Type N
  - 3. For reinforced masonry Cement Type S
  - 4. 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 or needed to provide required compressive strength of masonry.
  - 1. For masonry below grade or in contact with earth, use Type S.
  - 2. For Non Load Bearing Exterior Veneer use Type N
  - 3. For reinforced masonry, use Type S.
  - 4. For exterior, above-grade, load-bearing walls and parapet walls; for interior loadbearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type S.
  - 5. For interior non-load-bearing partitions, Type O may be used instead of Type N.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
  - 1. Pigments shall not exceed 10 percent of portland cement by weight.
  - 2. Application: Use pigmented mortar for exposed mortar joints with the following units:
    - a. Face Brick, Color 1:
      - 1) Submit Color sample to match existing.
- E. 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.
- 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.

# PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
  - 2. Verify that foundations are within tolerances specified.
  - 3. Verify that reinforcing dowels are properly placed.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- D. 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.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
  - 1. Mix units from several pallets or cubes as they are placed.
- F. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

### 3.3 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 or minus 1/4 inch.
  - 2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
  - 3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch 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, or 1/2 inch 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, 1/4 inch in 20 feet, or 1/2 inch maximum.
  - 3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch 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, 1/4 inch in 20 feet, or 1/2 inch maximum.
  - 5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
  - 6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
  - 7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.
- C. Joints:
  - 1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
  - 2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
  - 3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
  - 4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
  - 5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

# 3.4 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. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4-inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- H. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
  - 1. Install compressible filler in joint between top of partition and underside of structure above.
  - 2. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078446 "Fire-Resistive Joint Systems."

# 3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow brick and 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.

# 3.6 COMPOSITE MASONRY

A. Bond wythes of composite masonry together using one of the following methods: UNIT MASONRY
- 1. Masonry Joint Reinforcement: Installed in horizontal mortar joints.
  - a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
  - b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement.
- B. Collar Joints: Solidly fill collar joints by parging face of first wythe that is laid and shoving units of other wythe into place.
- C. Corners: Provide interlocking masonry unit bond in each wythe and course at corners unless otherwise indicated.
  - 1. Provide continuity with masonry joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.
- D. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows:
  - 1. Provide individual metal ties not more than 16 inches o.c.
  - 2. Provide continuity with masonry joint reinforcement by using prefabricated T-shaped units.
  - 3. Provide rigid metal anchors not more than 24 inches o.c. If used with hollow masonry units, embed ends in mortar-filled cores.

# 3.7 CAVITY WALLS

- A. Bond wythes of cavity walls together using one of the following methods:
  - 1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 4.5 sq. ft. of wall area spaced not to exceed 24 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.
    - a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.
    - b. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type ties to allow for differential movement regardless of whether bed joints align.
  - 2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.
    - a. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type reinforcement to allow for differential movement regardless of whether bed joints align.
  - 3. Masonry Veneer Anchors: Comply with requirements for anchoring masonry veneers.
- B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.
- C. Coat cavity face of backup wythe to comply with Section 071113 "Bituminous Dampproofing."

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- D. Installing Cavity-Wall Insulation Below Flashing at Slab on Grade: Place small dabs of adhesive, spaced approximately 12 inches o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
  - 1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

# 3.8 MASONRY JOINT REINFORCEMENT

- A. General: Install reinforcement bars as indicated in the Drawings. Revise three subparagraphs below if different spacing is required; delete if shown on Drawings.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

# 3.9 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:
  - 1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
  - 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
  - 3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

# 3.10 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to wall framing and masonry backup with masonry-veneer anchors to comply with the following requirements:
  - 1. Fasten screw-attached anchors wall framing and to masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
  - 2. Embed tie sections or connector sections and continuous wire in masonry joints. Provide not less than 2 inches of air space between back of masonry veneer and face of sheathing, or as indicated in the Drawings.
  - 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
  - 4. Space anchors as indicated, but not more than 16 inches o.c. vertically and 24 inches o.c. horizontally with not less than 1 anchor for each 3.5 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.

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### 3.11 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry as follows:
  1. Install preformed control-joint gaskets designed to fit standard sash block.
- C. Form expansion joints in brick as follows:
  - 1. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Section 079200 "Joint Sealants."

### 3.12 LINTELS

- A. Install steel lintels where indicated.
- B. Provide concrete or masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.

## 3.13 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
  - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
  - 2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and 1-1/2 inches into the inner wythe
  - 3. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under building paper or building wrap, lapping at least 4 inches.
  - 4. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
  - 5. Extend flexible flashing to within  $\frac{1}{2}$  inch back from outer face of masonry wall.
- C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- D. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:

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- 1. Use specified weep/vent products to form weep holes.
- 2. Space weep holes 24 inches o.c. unless otherwise indicated.
- E. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.
- F. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products to form vents.
  - 1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

## 3.14 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.

### 3.15 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
  - 1. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
- B. Testing Prior to Construction: One set of tests.
- C. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- D. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.
- E. Prism Test: For each type of construction provided, according to ASTM C 1314 at 7 days and at 28 days.

### 3.16 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
  - 3. Protect adjacent nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
  - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
  - 5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
  - 6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
  - 7. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

### 3.17 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- 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 042000

# SECTION 051200 - STRUCTURAL STEEL FRAMING

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section Includes:
  - 1. Structural steel.

### 1.2 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

### 1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

### 1.4 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication and erection of structural-steel components.

### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator.
- B. Welding certificates.

### 1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD, or who has successfully completed projects of a similar size and scope.
- B. Installer Qualifications: A qualified installer who has successfully complete projects of a similar size and scope.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code Steel."
- D. Comply with applicable provisions of the following specifications and documents:
  - 1. AISC 303.
  - 2. AISC 360.

STRUCTURAL STEEL FRAMING

3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

# PART 2 - PRODUCTS

### 2.1 STRUCTURAL-STEEL MATERIALS

- A. Channels, Angles, Shapes: ASTM A 36/A 36M.
- B. Plate and Bar: ASTM A 36/A 36M.
- C. Cold-formed Hollow Structural Sections: ASTM A500 Grade C, Fy = 50 ksi
- D. Welding Electrodes: Comply with AWS requirements.

### 2.2 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.

### 2.3 SHOP CONNECTIONS

A. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Verify, with certified steel erector present, existing conditions of above ceiling framing.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Conduct a preinstallation conference with erector and Special Inspector.

### 3.2 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

# 3.3 FIELD CONNECTIONS

- A. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
  - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
  - 2. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

## 3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
  - 1. Verify structural-steel materials and inspect steel frame joint details.
  - 2. Verify weld materials and inspect welds.
- B. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.
  - 1. In addition to visual inspection, test and inspect field welds according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
    - a. Liquid Penetrant Inspection: ASTM E 165.
    - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
    - c. Ultrasonic Inspection: ASTM E 164.
    - d. Radiographic Inspection: ASTM E 94.

END OF SECTION 051200

## SECTION 061000 - ROUGH CARPENTRY

### 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. Section Includes:
  - 1. Wood products.
  - 2. Wood-preservative-treated lumber.
  - 3. Dimension lumber framing.
  - 4. Miscellaneous lumber.
  - 5. Plywood backing panels.

### 1.3 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.
- B. Dimension Lumber: Lumber of 2 inches nominal size or greater but less than 5 inches nominal size in least dimension.
- C. Exposed Framing: Framing not concealed by other construction.
- D. Lumber grading agencies, and abbreviations used to reference them, include the following:
  - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
  - 2. NLGA: National Lumber Grades Authority.
  - 3. SPIB: The Southern Pine Inspection Bureau.

## 1.4 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 materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.

- 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
- 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency in accordance with ASTM D5664.
- 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

### 1.5 INFORMATIONAL SUBMITTALS

- A. Material Certificates:
  - 1. For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
  - 2. For preservative-treated wood products. Indicate type of preservative used and net amount of preservative retained.

## 1.6 DELIVERY, STORAGE, AND HANDLING

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

### PART 2 - PRODUCTS

### 2.1 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPA U1, Use categories as follows:
  - 1. UC2: Interior construction not in contact with ground but may be subject to moisture. Include the following items:
    - a. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
    - b. Wood floor plates that are installed over concrete slabs-on-grade.
    - c. Wood millwork.
    - d. Wood flooring.
  - 2. UC3A (All Other Commodity Specifications): Coated products excluding sawn products in exterior construction not in contact with ground, exposed to all weather cycles but protected from liquid water. Include the following items:

### ROUGH CARPENTRY

- a. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
- b. Wood sheathing.
- 3. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- 4. After treatment, redry dimension lumber to 19 percent maximum moisture content.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
  - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
- D. Application: Treat items indicated on Drawings, and the following:
  - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

### 2.2 MISCELLANEOUS LUMBER

- A. Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
  - 1. Blocking.
  - 2. Nailers.
  - 3. Rooftop equipment bases and support curbs.
  - 4. Furring.
  - 5. Grounds.
  - 6. Utility shelving.
- B. Dimension Lumber Items: Standard, Stud, or No. 3 grade lumber of any of the following species:
  - 1. Hem-fir (north); NLGA.
  - 2. Mixed southern pine or southern pine; SPIB.
  - 3. Spruce-pine-fir; NLGA.
  - 4. Hem-fir; WCLIB or WWPA.
  - 5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
  - 6. Eastern softwoods; NeLMA.

- C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

# 2.3 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

### 2.4 FASTENERS

- A. General: Fasteners are to be of size and type indicated and comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches into wood substrate.
  - 1. Where rough carpentry is exposed to weather, in ground contact, pressurepreservative treated, or in area of high relative humidity, provide fasteners with hotdip zinc coating complying with ASTM A153/A153M or ASTM F2329.
- B. Nails, Brads, and Staples: ASTM F1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC58, ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.

## 2.5 MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.
- B. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.

C. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

## PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- C. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- D. Install sill sealer gasket/termite barrier in accordance with manufacturer's written instructions at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.
- E. Do not splice structural members between supports unless otherwise indicated.
- F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
  - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
  - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
  - 2. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
- H. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

- I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
  - 1. Use inorganic boron for items that are continuously protected from liquid water.
  - 2. Use copper naphthenate for items not continuously protected from liquid water.
- J. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- K. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  - 1. Table 2304.10.1, "Fastening Schedule," in ICC's International Building Code (IBC).
  - 2. ICC-ES evaluation report for fastener.
- L. Securely attach roofing nailers to substrates by anchoring and fastening to withstand bending, shear, or other stresses imparted by Project wind loads and fastener-resistance loads as designed in accordance with ASCE/SEI 7.
- M. Use steel common 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 between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

# 3.2 INSTALLATION OF WOOD BLOCKING AND NAILERS

- A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach wood blocking to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
- C. Attach wood roofing nailers securely to substrate to resist the designed outward and upward wind loads indicated on Drawings and in accordance with ANSI/SPRI ED-1, Tables A6 and A7.
- D. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

## 3.3 INSTALLATION OF WOOD FURRING

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

# 3.4 **PROTECTION**

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

## SECTION 061600 - SHEATHING

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section Includes:
  - 1. Wall sheathing.
  - 2. Sheathing joint-and-penetration treatment materials.
- B. Related Requirements:
  - 1. Section 072703 "Foamed-In-Place Insulation Air Barrier" for water-resistive barrier applied over wall sheathing.

## 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
  - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
  - 3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency in accordance with ASTM D5516.
  - 4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
  - 5. For air-barrier and water-resistant glass-mat gypsum sheathing, include manufacturer's technical data and tested physical and performance properties of products.
- B. Shop Drawings: For air-barrier and water-resistant glass-mat gypsum sheathing assemblies.
  - 1. Show locations and extent of sheathing, accessories, and assemblies specific to Project conditions.
  - 2. Include details for sheathing joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
  - 3. Include details of interfaces with other materials that form part of air barrier.

## 1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
  - 1. Air-barrier and water-resistant glass-mat gypsum sheathing.

B. Field quality-control reports.

### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer of air-barrier and water-resistant glass-mat gypsum sheathing.
  - 1. Installer is to be licensed by ABAA in accordance with ABAA's Quality Assurance Program and is to employ ABAA-certified installers and supervisors on Project.
- B. Testing Agency Qualifications:
  - 1. 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.
  - 2. For testing and inspecting agency providing tests and inspections related to air-barrier and water-resistant glass-mat gypsum sheathing: an independent agency, qualified in accordance with ASTM E329 for testing indicated, and certified by Air Barrier Association of America, Inc.

### 1.5 DELIVERY, STORAGE, AND HANDLING

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

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

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

# 2.2 WALL SHEATHING

- A. Glass-Mat Gypsum Sheathing, Walls: ASTM C1177/C1177M.
  - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
    - a. <u>Certainteed; SAINT-GOBAIN</u>.
    - b. <u>Continental Building Products Inc.</u>

- c. <u>National Gypsum Company</u>.
- d. <u>USG Corporation</u>.
- 2. Type and Thickness: Type X, 5/8 inch thick.
- 3. Size: 48 by 96 inches for vertical installation.

### 2.3 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. For wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M
- B. Nails, Brads, and Staples: ASTM F1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.
  - 1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C1002.
  - 2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C954.

### 2.4 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

- A. Sealant for Paper-Surfaced and Glass-Mat Gypsum Sheathing: Elastomeric, mediummodulus, neutral-curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated and complying with requirements for elastomeric sealants specified in Section 079200 "Joint Sealants."
- B. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.
  - 1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

### PART 3 - EXECUTION

## 3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
  - 1. Table 2304.10.1, "Fastening Schedule," in the ICC's International Building Code.
  - Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
  - 3. ICC-ES evaluation report for fastener.
- D. 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 sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

## 3.2 INSTALLATION OF GYPSUM SHEATHING

- A. Comply with GA-253 and with manufacturer's written instructions.
  - 1. Fasten gypsum sheathing to cold-formed metal framing with screws.
  - 2. Install panels with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
  - 3. Install panels with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.

- 1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.
- D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.
  - 1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.
- E. Seal sheathing joints according to sheathing manufacturer's written instructions.
  - 1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
  - 2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

## 3.3 FIELD QUALITY CONTROL

- A. ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, and inspections under ABAA's Quality Assurance Program.
- B. Testing and Inspecting Agency: [Owner will engage] [Engage] a qualified testing agency to perform tests and inspections.
- C. Inspections: Air-barrier and water-resistant glass-mat gypsum sheathing, 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. 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.
  - 3. Termination mastic has been applied on cut edges.
  - 4. Strips and transition strips have been firmly adhered to substrate.
  - 5. Compatible materials have been used.
  - 6. Transitions at changes in direction and structural support at gaps have been provided.
  - 7. Connections between assemblies (sheathing and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
  - 8. All penetrations have been sealed.
- D. Tests: As determined by testing agency from among the following tests:
  - 1. Air-Leakage-Location Testing: Air-barrier sheathing assemblies will be tested for evidence of air leakage in accordance with [ASTM E1186, chamber pressurization

or depressurization with smoke tracers] [ASTM E1186, chamber depressurization using detection liquids] </br>

- 2. Air-Leakage-Volume Testing: Air-barrier assemblies will be tested for air-leakage rate in accordance with [ASTM E783] [or] [ASTM E2357].
- E. Air barriers will be considered defective if they do not pass tests and inspections.
- F. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
- G. Prepare test and inspection reports.

END OF SECTION 061600

# SECTION 062023 - INTERIOR FINISH CARPENTRY

## 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 trim.
- B. Related Requirements:
  - 1. Section 061000 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view and for framing exposed to view.
  - 2. Section 064116 "Plastic-Laminate-Clad Architectural Cabinets" for shop-fabricated carpentry.
  - 3. Section 099123 "Interior Painting" for priming and priming of interior finish carpentry.
  - 4. Section 099300 "Staining and Transparent Finishing" for finishes applied to finish carpentry.

### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.
  - 1. Include data for wood-preservative treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include chemical-treatment manufacturer's written instructions for finishing treated material.
  - 2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced before shipment to Project site to levels specified.
- B. Samples: For each exposed product and for each color and texture specified.
- C. Samples for Initial Selection: For each type of product involving selection of colors, profiles, or textures.
- D. Samples for Verification:

## INTERIOR FINISH CARPENTRY

- 1. For each species and cut of lumber and panel products with nonfactory-applied finish, with half of exposed surface finished; 50 sq. in. for lumber and 8 by 10 inches for panels.
- 2. For each finish system and color of lumber and panel products with factory-applied finish, 50 sq. in. for lumber and 8 by 10 inches for panels.

# 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation.
  - 1. Protect materials from weather by covering with waterproof sheeting, securely anchored.
  - 2. Provide for air circulation around stacks and under coverings.
- B. Deliver interior finish carpentry materials only when environmental conditions comply with requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions comply with requirements specified for installation areas.

## 1.5 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet-work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
  - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

## PART 2 - PRODUCTS

## 2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. For exposed lumber, mark grade stamp on end or back of each piece.

B. Hardboard: ANSI A135.4.

# 2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2.
  - 1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 18 percent, respectively.
  - 2. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
  - 3. For exposed items indicated to receive transparent finish, do not use chemical formulations that contain colorants or that bleed through or otherwise adversely affect finishes.
  - 4. Do not use material that is warped or does not comply with requirements for untreated material.
  - 5. Mark lumber with treatment-quality mark of an inspection agency approved by the ALSC's Board of Review.
    - a. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
  - 6. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
    - a. For exposed plywood indicated to receive a stained or natural finish, mark back of each piece.
  - 7. Application: All interior lumber and plywood.

### 2.3 INTERIOR TRIM

- A. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish):
  - 1. Species and Grade: White maple; NHLA Clear A Finish.
  - 2. Maximum Moisture Content: 13 percent.
  - 3. Finger Jointing: Not allowed.
  - 4. Gluing for Width: Use for lumber trim wider than 6 inches.
  - 5. Veneered Material: Use for lumber trim wider than 6 inches.
  - 6. Face Surface: Surfaced (smooth).
  - 7. Matching: Selected for compatible grain and color.

## 2.4 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
- B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
  - 1. Verify adhesives have a VOC content of 30 g/L or less.

- C. Multipurpose Construction Adhesive: Formulation, complying with ASTM D3498, that is recommended for indicated use by adhesive manufacturer.
  - 1. Verify adhesives have a VOC content of 70 g/L or less.

### 2.5 FABRICATION

- A. Back out or kerf backs of the following members, except those with ends exposed in finished work:
  - 1. Interior standing and running trim, except shoe and crown molds.
  - 2. Wood-board paneling.
- B. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

### PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

## 3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound; warped; improperly treated or finished; inadequately seasoned; too small to fabricate with proper jointing arrangements; or with defective surfaces, sizes, or patterns.
- B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials.
  - 1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.

- 2. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
- 3. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
- 4. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

# 3.4 INSTALLATION OF INTERIOR TRIM

- A. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available.
  - 1. Do not use pieces less than 24 inches long, except where necessary.
  - 2. Stagger joints in adjacent and related standing and running trim.
  - 3. Miter at returns, miter at outside corners, and cope at inside corners to produce tightfitting joints with full-surface contact throughout length of joint.
  - 4. Use scarf joints for end-to-end joints.
  - 5. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
  - 6. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.
  - 7. Install trim after gypsum-board joint finishing operations are completed.
  - 8. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting.
  - 9. Fasten to prevent movement or warping.
  - 10. Countersink fastener heads on exposed carpentry work and fill holes.

## 3.5 ADJUSTING

- A. Replace interior finish carpentry that is damaged or does not comply with requirements.
  - 1. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.
- B. Adjust joinery for uniform appearance.

### 3.6 CLEANING

- A. Clean interior finish carpentry on exposed and semiexposed surfaces.
- B. Restore damaged or soiled areas and touch up factory-applied finishes if any.

### 3.7 **PROTECTION**

A. Protect installed products from damage from weather and other causes during construction.

## INTERIOR FINISH CARPENTRY

- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
  - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 062023

## SECTION 064116 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Plastic-laminate-clad architectural cabinets.
  - 2. Plastic-laminate-clad architectural countertops.
  - 3. Cabinet hardware and accessories.
  - 4. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.
- B. Related Requirements:
  - 1. Section 061000 "Rough Carpentry" and Section 061053 "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.

### 1.2 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated, including cabinet hardware, hinges and accessories.
  - 1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, and attachment details.
  - 2. Show large-scale details.
  - 3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
  - 4. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.
  - 5. Apply AWI Quality Certification or WI Certified Compliance Program label to Shop Drawings.
- C. Samples for Verification: For the following:

- 1. Plastic Laminates: 8 by 10 inches, for each type, color, pattern, and surface finish required.
- 2. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.
- 3. PVC Edge Material: 3 mm thickness.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and Installer.
- B. Product Certificates: For each type of product, singed by product manufacturer.
- C. Field quality-control reports.

### 1.5 CLOSEOUT SUBMITTALS

A. Quality Standard Compliance Certificates: AWI Quality Certification Program or WI Certified Compliance Program certificates.

### 1.6 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful inservice performance.
- B. Quality Standard: Cabinets and countertops shall be constructed per AWI's standards, but do not require AWI's Quality Certification Program.
- C. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with such selections and requirements in addition to the quality standard.

## 1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

### 1.8 FIELD CONDITIONS

A. Environmental Limitations without Humidity Control: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

- B. Field Measurements: Where cabinets are 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 cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.
- C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

## PART 2 - PRODUCTS

# 2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.
- B. Architectural Woodwork Standards Grade: Premium.
- C. AWI Type of Cabinet Construction: Flush overlay.
- D. WI Construction Style: Style A, Frameless.
- E. WI Construction Type: Type I, multiple self-supporting units rigidly joined together.
- F. WI Door and Drawer Front Style: Flush overlay.
- G. Reveal Dimension: 1/4 inch.
- H. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Abet Laminati Inc.
    - b. Formica Corporation.
    - c. Lamin-Art, Inc.
    - d. Pionite; a Panolam Industries International, Inc. brand.
    - e. Wilsonart LLC.
- I. Laminate Cladding for Exposed Surfaces:
  - 1. Horizontal Surfaces: Grade HGS.

- 2. Vertical Surfaces: Grade HGS.
- 3. Edges: PVC edge banding, 3.0 mm thick, matching laminate in color, pattern, and finish.
- 4. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.
- J. Materials for Semiexposed Surfaces:
  - 1. Surfaces Other Than Drawer Bodies: Thermally fused laminate panels.
    - a. Edges of Plastic-Laminate Shelves: PVC edge banding, 3.0 mm thick, matching laminate in color, pattern, and finish.
    - b. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.
  - 2. Drawer Sides and Backs: Solid-hardwood lumber or Thermally fused laminate panels with PVC or polyester edge banding.
  - 3. Drawer Bottoms: Hardwood plywood or Thermally fused laminate panels.
- K. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
- L. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
  - 1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.
- M. 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 on Drawings.

# 2.2 PLASTIC-LAMINATE COUNTERTOPS

- A. Grade: Premium.
- 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 on Drawings.
- D. Grain Direction: Parallel to cabinet fronts.
- E. Edge Treatment: PVC edge banding, 0.12 inch (3 mm) thick, color as selected from manufacturer's full range including in stock, special order and patterned selections to match plastic laminates.

- F. Core Material: Medium-density fiberboard.
- G. Core Material at Sinks: Marine grade fiberboard made with exterior glue or marine grade plywood.

### 2.3 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
  - 1. Wood Moisture Content: 5 to 10 percent.
- B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
  - 1. Hardboard: AHA A135.4.
  - 2. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde.
  - 3. Softwood Plywood: DOC PS 1, medium-density overlay.
  - 4. Thermally Fused Laminate (TFL) Panels: MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.
  - 5. Provide PVC edge banding complying with LMA EDG-1 on components with exposed or semi-exposed edges.

### 2.4 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)."
- B. Butt Hinges: 2-3/4-inch, five-knuckle steel hinges made from 0.095-inch-thick metal, and as follows:
  - 1. Semiconcealed Hinges for Overlay Doors: ANSI/BHMA A156.9, B01521.
- C. Back-Mounted Pulls: ANSI/BHMA A156.9, B02011.
  - 1. Doug Mockett & Company, Inc.: Model No. DP128. Satin stainless steel or approved equal. Meets ADA guidelines.
- D. Catches: Magnetic catches, ANSI/BHMA A156.9, B03141.
- E. Adjustable Shelf Standards and Supports: Pre-drilled 1/8" diameter circular holes spaced 3" o.c.
- F. Shelf Rests: ANSI/BHMA A156.9, B04013; metal.

- G. Drawer Slides: ANSI/BHMA A156.9.
  - 1. Heavy-Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted.
    - a. Type: Full overtravel extension.
    - b. Material: Zinc-plated ball bearing slides.
    - c. Motion Feature: Soft close dampener.
  - 2. Pencil drawers not more than 3 inches high and not more than 24 inches wide, provide 50 lb load capacity.
  - 3. General-purpose drawers more than 3 inches high, but not more than 6 inches high and not more than 24 inches wide, provide 75 lb load capacity.
  - 4. File drawers more than 6 inches high or more than 24 inches, provide 100 lb load capacity.
  - 5. Lateral file drawers more than 6 inches high and more than 24 inches but not more than 30 inches wide, provide 150 lb load capacity.
  - 6. Lateral file drawers more than 6 inches high and more than 30 inches wide, provide 200 lb load capacity.
- H. Door Locks: ANSI/BHMA A156.11, E07121.
- I. Drawer Locks: ANSI/BHMA A156.11, E07041.
- J. Door and Drawer Silencers: ANSI/BHMA A156.16, L03011.
- K. Self-latching Flush Bolt: Flush mounted locking device for the inactive leaf of a pair of doors that latches automatically and unlatches manually.
- L. Grommets for Cable Passage: 2-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
  - 1. Color: Black.
  - 2. Product: Subject to compliance with requirements, provide "SG series" by Doug Mockett & Company, Inc.
- M. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for ANSI/BHMA finish number indicated.
  - 1. Satin Stainless Steel: ANSI/BHMA 630.
- N. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9.
- O. Worksurface Support: For heavy duty workloads.
  - 1. Doug Mockett & Company, Inc.: Model No. SWS4. Satin stainless steel or approved equal. Meets ADA requirements. Provide with flat bar center support on wall were needed.

## 2.5 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 metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement containing no urea formaldehyde.
  - 1. Adhesive for Bonding Edges: Hot-melt adhesive.

### 2.6 FABRICATION

- A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.
- B. 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.
  - 1. Notify Architect seven days in advance of the dates and times architectural cabinet fabrication will be complete.
  - 2. Trial fit assemblies at manufacturer's shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.
- C. Shop-cut openings to maximum extent possible to receive hardware, appliances, 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.

## PART 3 - EXECUTION

# 3.1 PREPARATION

A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

### 3.2 INSTALLATION

- A. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.
  - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
  - 2. Install cabinets without distortion so doors and drawers fit openings 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.
  - 3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1 penetration into wood framing, blocking, or hanging strips.
- E. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
  - 1. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
  - 2. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
  - 3. Secure backsplashes to tops with concealed metal brackets at 16 inches o.c. and to walls with adhesive.
  - 4. Caulk space between backsplash and wall with sealant specified in Division 07 Section "Joint Sealants."
- F. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

## 3.3 FIELD QUALITY CONTROL

- A. Inspections: Provide inspection of installed Work through AWI's Quality Certification Program or WI's Certified Compliance Program certifying that woodwork, including installation, complies with requirements of the Architectural Woodwork Standards for the specified grade.
  - 1. Inspection entity shall prepare and submit report of inspection.

# 3.4 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION 064116
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# SECTION 072703 - FOAMED-IN-PLACE INSULATION AIR BARRIER

# PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section Includes:
  - 1. Closed-cell spray polyurethane foam insulation air barrier located in the nonaccessible part of the wall
  - 2. Materials to bridge and seal the following air leakage pathways and gaps:
    - a. Connections of the walls to the roof air barrier.
    - b. Connections of the walls to the foundation air barrier.
    - c. Seismic and expansion joints.
    - d. Openings and penetrations of window frames, storefront, curtain wall.
    - e. Masonry ties, screws, bolts and similar penetrations.
    - f. All other air leakage pathways in the building envelope.
- B. Related Requirements:
  - 1. Section 014000 "Quality Requirements" for coordination with Owner's independent testing and inspection agency.
  - 2. Section 015999 "Temporary Facilities and Controls" for requirement to schedule work and prevent sunlight and weather exposure of materials beyond limits established by manufacturer; requirement to protect materials from damage after installation and prior to installation of enclosing work.
  - 3. Section 042000 "Unit Masonry" for flexible through wall flashing and the requirement that backup masonry joints are flush and completely filled with mortar, and that excess mortar on brick ties will be removed; requirement for gap at deflection joints and fillers; coordination with sequencing of through-wall flashing.
  - 4. Section 054000 "Cold-Formed Metal Framing" for load-bearing, metal exterior wall framing assemblies to support the closed cell, medium density sprayed polyurethane foam.
  - 5. Section 061600 "Sheathing" for wall sheathings and wall sheathing joint and penetration treatments.

# 1.2 DEFINITIONS

- A. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.
- B. Air-Barrier Assembly: The collection of air-barrier materials and accessories applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.
- C. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.

### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review foam insulation air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

#### 1.4 ACTION SUBMITTALS

- A. Product Data:
  - 1. Closed-cell spray polyurethane foam insulation air barrier.
    - a. Submit material Manufacturer's Product Data, material manufacturer's instructions for evaluating, preparing, and treating substrate, temperature and other limitations of installation conditions, Technical Data, and tested physical and performance properties.
    - b. Submit letter from primary foam insulation air barrier material manufacturer indicating approval of materials that are proposed to be used that are not currently listed in the accessories section of this specification for that manufacturer's material.
    - c. Include statement from the primary foam insulations air barrier material manufacturer that the materials used in their air barrier assembly which will be used to adhere to the underlying substrate are chemically compatible to the substrate material.
  - 2. Accessories.
- B. Shop Drawings: For foam insulation air-barrier assemblies.
  - 1. Show locations and extent of foam insulation air barrier materials, accessories, and assemblies specific to Project conditions.
  - 2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
  - 3. Include details of interfaces with other materials that form part of air barrier.
- C. Compatibility: Submit letter from primary material manufacturers stating that materials proposed for use are permanently chemically compatible and adhesively compatible with adjacent materials proposed for use. Submit letter from material manufacturer stating that cleaning materials used during installation are chemically compatible with adjacent materials proposed for use.

# 1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each air barrier assembly, for tests performed by qualified testing agency.

- B. Product Certificates: From foam air-barrier manufacturer, certifying compatibility of foam insulation air barriers and accessory materials with materials that connect to or that come in contact with air barrier.
- C. Manufacturer's Certification:
  - 1. Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
  - 2. Submit manufacturer's Hydrofluorocarbon (HFC) compliance statement.
- D. Evaluation Reports: For spray-applied polyurethane foam- insulation air barrier, from ICC-ES.
- E. Appropriate Fire Resistance Assembly approval per Type Building Construction and Wall design (NFPA 285, ASTM E119, UL 263).
- F. Qualification Statements: For Installer. Submit evidence of current Contractor accreditation and Installer certification under the Air Barrier Association of America's (ABAA) Quality Assurance Program (QAP). Submit accreditation number of the Contractor and certification number(s) of the ABAA Certified Installer(s).

# 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Remove and replace materials that cannot be applied within their stated shelf life.
- B. Protect stored materials from direct sunlight.

#### 1.7 FIELD CONDITIONS

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended in writing 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 SOURCE LIMITATIONS

A. Obtain primary foam insulation air-barrier materials and air-barrier accessories from single source from single manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

A. Material Performance: Provide air barrier materials which have an air permeance not to exceed 0.004 cubic feet per minute per square foot under a pressure differential of 1.57

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pounds per square foot (0.004 cfm/ft<sup>2</sup> @ 1.57 psf), when tested in accordance with ASTM E2178 (unmodified).

- B. The water vapor permeance shall be determined in accordance with ASTM E96 and shall be declared by the material manufacturer.
- C. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier. 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.
- D. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. when tested according to ASTM E2357.
- E. Connections to Adjacent Materials: Provide connections to prevent air leakage at the following locations:
  - 1. Foundation and walls, including penetrations, ties and anchors.
  - 2. Walls, windows, curtain walls, storefronts, louvers and doors.
  - 3. Different assemblies and fixed openings within those assemblies.
  - 4. Wall and roof connections.
  - 5. Floors over unconditioned space.
  - 6. Walls, floor and roof across construction, control and expansion joints.
  - 7. Walls, floors and roof to utility, pipe and duct penetrations.
  - 8. Seismic and expansion joints.
  - 9. All other potential air leakage pathways in the building envelope.

# 2.3 CLOSED-CELL SPRAY POLYURETHANE FOAM INSULATION AIR BARRIER

- A. Closed-Cell Spray Polyurethane Foam: ASTM C1029, Type II, minimum density of 2.0 lb/cu. Ft. and minimum aged R-value at 1-inch thickness of 6.2 deg F x h x sq. ft./Btu at 75 deg F.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include are the following:
    - a. NCFI, "Insul Star HFO."
    - b. Huntsman, "Heatlok HFO Pro"
    - c. Henry Company, "Permax 2.0 HFO"
    - d. Carlisle Spray Foam Insulation, "SealTite Pro One Zero"
    - e. Johns Manville, "JM Corbond IV SPF"
  - 2. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Flame-Spread Index: 25 or less.
    - b. Smoke-Developed Index: 450 or less.

- 3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
- 4. Environmental Requirements:
  - a. The product shall have a product specific Environmental Product Declaration.
  - b. Global Warming Potential: Less than or equal to one (1).
  - c. Ozone Depletion Potential: Zero (0).
- 5. Toxicity and Hazardous Materials:
  - a. Product containing no added urea-formaldehyde.
  - b. PDBE-free product.
  - c. Free of flammable blowing agents.
  - d. Does not contain Hydrofluorocarbons (HFCs)

### 2.4 ACCESSORIES

- A. Primer: Material recommended by insulation manufacturer where required for adhesion of insulation to substrates.
- B. Membrane at Transitions in Substrate and Connections to Adjacent Elements shall be compatible with foam air barrier.
- C. Transition Membrane between Air Barrier Membrane and Roofing and Other Adjacent Materials: Comply with both air barrier manufacturer's recommendations and material manufacturer's recommendations.
- D. Counter-flashing for Masonry Through-Wall Flashing: Comply with both air barrier manufacturer's recommendations and material manufacturer's recommendations.
- E. Thermal Barrier: Material barrier intended to separate foam plastic from the interior of a building to prevent flame-source access to foam and delay temperature-rise of foam during a fire event.
  - 1. Gypsum Wallboard: 0.5-inch minimum thickness.

# 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 substrates have cured and aged for minimum time recommended in writing by air-barrier manufacturer.
  - 3. Verify that substrates are visibly dry and free of moisture.

# FOAMED-IN-PLACE INSULATION AIR BARRIER

- 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 PREPARATION

- A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate in accordance with manufacturer's written instructions and details. 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. Priming: Prime substrates where recommended by insulation manufacturer. Apply primer to comply with insulation manufacturer's written instructions. Confine primers to areas to be insulated; do not allow spillage or migration onto adjoining surfaces.

### 3.3 INSTALLATION

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Transition Strip Installation: Install air barrier accessories and closed cell, medium density spray polyurethane foam to provide continuity throughout the building envelope. Install materials in accordance with manufacturer's instructions and the following (unless manufacturer requires other procedures in writing based on project conditions or particular requirements of their recommended materials):
  - 1. Install transition membranes and window flashings, flash penetrations with compatible flashing membrane.
  - 2. Connect air barrier in exterior wall assembly continuously to the air barrier of the roof, to concrete below-grade structures, to windows, curtain wall, storefront, louvers, exterior doors and other intersection conditions and perform sealing of penetrations, using accessory materials and in accordance with the manufacturer's recommendations.
  - 3. At control joints, provide backup for the membrane to accommodate anticipated movement.
  - 4. At expansion joints provide transition to the joint assemblies.
  - 5. Inspect installation prior to enclosing assembly and repair damaged areas with closed cell, medium density spray polyurethane foam as recommended by manufacturer.
- C. Installation of Spray Polyurethane Foam: Install materials in accordance with manufacturer's instructions and the following:
  - 1. Spray insulation to envelop entire area to be insulated and fill voids.
  - 2. Apply in multiple passes to not exceed maximum thicknesses recommended by manufacturer. Do not spray into rising foam.

- 3. Framed Construction: Install into cavities formed by framing members to achieve thickness indicated on Drawings.
- 4. Miscellaneous Voids: Apply according to manufacturer's written instructions.
- 5. Finished surface of foam insulation to be free of voids and embedded foreign objects.
- 6. Remove masking materials and over spray from adjacent areas immediately after foam surface has hardened. Ensure cleaning methods do not damage work performed by other sections.
- 7. Complete connections to other air barrier components and repair any gaps, holes or other damage using material in a manner approved by primary air barrier material manufacturer.

# 3.4 **PROTECTION**

- A. Protect foam insulation air barrier materials from damage during installation and the remainder of the construction period, according to material manufacturer's written instructions.
  - 1. Coordinate with installation of materials which cover the air barrier assemblies, to ensure exposure period does not exceed that recommended by the air barrier material manufacturer.
- B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction and acceptable to the primary material manufacturer.

END OF SECTION 072119

# SECTION 074213.13 - FORMED METAL WALL PANELS

# PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section Includes:
  - 1. Concealed-fastener, lap-seam metal wall panels.
- B. Related Requirements:
  - 1. Section 074800 "Thermally Broken Attachment System" for thermally broken z-girt attachment system for formed metal wall panels.

### 1.2 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 doors, windows, and louvers.
  - 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 flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal panels.
  - 6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
  - 7. Review temporary protection requirements for metal panel assembly during and after installation.
  - 8. Review of procedures for repair of metal panels damaged after installation.
  - 9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

# 1.3 ACTION SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
  - 1. Concealed-fastener, lap-seam metal wall panels.

### FORMED METAL WALL PANELS

- 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 1-1/2 inches per 12 inches.
- C. Samples for Verification: For each type of exposed finish, prepared on Samples of size indicated below:
  - 1. Metal Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.
- D. Delegated Design Submittals: For formed metal wall panels, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

# 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For concealed-fastener, lap-seam metal wall panels.
- C. Delegated Design Engineer Qualifications: For formed metal wall panels.
- D. Field quality-control reports.
- E. Sample Warranties: For special warranties.

#### 1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panels to include in maintenance manuals.

### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Delegated Design Engineer Qualifications: A professional engineer who is legally qualified to practice in state where Project is located and who is experienced in providing engineering services of the type indicated.
- C. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

# 1.7 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.

### 1.8 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.

### 1.9 COORDINATION

A. 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.

#### 1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
  - 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: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show 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 Delta E units when tested according to ASTM D2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.

- 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. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
  - 1. Wind Loads: As indicated on Drawings.
  - 2. Other Design Loads: As indicated on Drawings.
  - 3. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E283 at the following test-pressure difference:
  - 1. Test-Pressure Difference: 1.57 lbf/sq. ft.
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E331 at the following test-pressure difference:
  - 1. Test-Pressure Difference: 2.86 lbf/sq. ft.
- D. 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, ambient; 180 deg F, material surfaces.

### 2.2 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS

- A. Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side laps. Include accessories required for weathertight installation.
- B. Flush-Profile, Concealed-Fastener Metal Wall Panels: Formed with vertical panel edges and a flat pan between panel edges; with flush joint between panels
  - 1. Basis of Design Product: Subject to compliance with requirements, provide Morin, Matrix MX-l profile, or comparable product by one of the following:
    - a. <u>ATAS International, Inc</u>.
    - b. <u>CENTRIA, a Nucor Brand</u>.
    - c. Dimensional Metals, Inc.
    - d. <u>Englert, Inc</u>.

- e. <u>Fabral; a brand of OmniMax International</u>.
- f. <u>MBCI; Cornerstone Building Brands</u>.
- g. AEP Span; a BlueScope Steel company
- h. Morin; A Kingspan Group Company
- 2. Aluminum Sheet: Coil-coated sheet, ASTM B209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
  - a. Thickness: 0.040 inch.
  - b. Surface: Smooth, flat finish.
  - c. Exterior Finish: Two-coat fluoropolymer.
  - d. Color: As indicated on the Drawings.
- 3. Panel Width: 12 inches.
- 4. Panel Depth: 1 1/2 inches.
- 5. Panel Orientation: Horizontal

# 2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: As indicated in Section 074800 "Thermally Broken Attachment System".
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fascia, 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 rakes, fabricated of same metal as metal panels.
  - 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
  - 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefinfoam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. 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, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- E. 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 wide and 1/8 inch thick.
- 2. Joint Sealant: ASTM C920; elastomeric polyurethane or 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.
- 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

# 2.4 FABRICATION

- A. 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. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. 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.
- E. 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 Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
  - 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 wall panel manufacturer for application but not less than thickness of metal being secured.

# 2.5 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 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.
- C. Aluminum Panels and Accessories:
  - 1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (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.

# 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 wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
    - a. Verify that air- or water-resistive barriers have been installed over 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. Air/Moisture Barriers: Confirm that work has been completed, inspected, and tested as required.
- D. Openings: Verify that window, door, louver, and other penetrations match layout on shop drawings.
- E. 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 C754 and metal panel manufacturer's written recommendations.

# 3.3 INSTALLATION OF METAL PANELS

- A. 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. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
  - 7. 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.
  - 8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
  - 1. Aluminum Panels: Use aluminum or stainless steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.
- C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- D. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
  - 1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
  - 2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
  - 3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
  - 4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
  - 5. Flash and seal panels with weather closures at perimeter of all openings.
- E. Watertight Installation:
  - 1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels; and elsewhere as needed to make panels watertight.

- 2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
- 3. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.
- F. 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 wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.
- G. 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 are permanently watertight.
  - 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 performance.
  - 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

# 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Water-Spray Test: After installation, test 100 square foot area of assembly as directed by Architect once for water penetration according to AAMA 501.2.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal wall panel installation, including accessories.
- D. Remove and replace metal wall panels where tests and inspections indicate that they do not comply with specified requirements.
- E. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- F. Prepare test and inspection reports.

# 3.5 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. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074213.13

# PART 1 GENERAL

### 1.1 SYSTEM DESCRIPTION

- A. Provide a thermally broken, rainscreen attachment system to sufficiently support cladding installed over exterior insulation while maintaining visual design concepts.
- B. Related Requirements:
  - 1. Section 074213.23 "Formed Metal Wall Panels" for metal panels attached with thermally broken attachment system.
- C. Design Requirements:
  - 1. Employ qualified professional engineer licensed in State of Virginia to perform structural design.
  - 2. Design furring system to withstand live and dead loads as indicated on the drawings.
  - 3. Minimum stud gauge of back-up wall assembly to be 43 mil thickness.
  - 4. Continuous, solid, non-perforated framing profiles (including C- or Z-shaped sections or furring) penetrating insulation are not allowed.
  - 5. Attachment system must have proven thermal isolation with a reduction in thermal bridging as indicated by calculations or finite element analysis in accordance with ASHRAE guidelines.
  - 6. Fasteners: tension shall be taken as the sum of direct tension plus tension due to prying for eccentrically loaded connections. Prying may be reduced or eliminated if proven via engineering analysis or testing.

# 1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
  - 1. Attendance: Architect, Owner, Contractor, installer, and related trades.
  - 2. Review: Project conditions, back-up wall framing, manufacturer requirements, delivery and storage, staging and sequencing, and protection of completed work.

# 1.3 SUBMITTALS

- A. Action Submittals:
  - 1. Drawings: Illustrate products, installation, spacing and connection to adjacent construction.
  - 2. Product Data: Manufacturer's descriptive data and product attributes.
  - 3. Samples: Verification samples.
- B. Informational Submittals:
  - 1. Structural calculations: Manufacturer's comprehensive structural design analysis signed and sealed by a registered professional engineer.

# 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Firm specializing in work of this Section, with minimum 3 years' documented experience.
- B. Mock-Ups: Coordinate mock-up materials and requirements with mock-up specified in exterior cladding specifications.
- C. Single source responsibility: Furnish engineered rainscreen attachment system components under direct responsibility of single manufacturer.
- 1.5 DELIVERY, STORAGE AND HANDLING
  - A. Deliver materials in manufacturers' original, unopened and undamaged containers or crates. Keep materials clean, dry and free of dirt and other debris and protect from weather or construction activities. Follow manufacturers' recommendations.

### 1.6 WARRANTY

- A. Manufacturer's 10-year limited warranty against structural failure of system; includes the labor and material cost for removal and replacement of defective material; includes the labor cost for removal and reinstallation of overlying façade finish panels as required to access defective materials. All materials and components to be supplied and installed per manufacturer's requirements. Excludes repairs, replacement, and corrective work to the substrate, primary structure, finish panels, and/or property unless otherwise noted above.
- B. Installer's 2-year warranty against defects in installation of system.

#### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- 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. Knight Wall Systems. <u>www.knightwallsystems.com</u>
  - 2. Approved equal.

# 2.2 MATERIALS

- A. Steel Sheet:
  - 1. Steel classification: Structural steel, 50 ksi yield strength.
  - 2. Corrosion protection coating: ASTM A1046, zinc-aluminum-magnesium, minimum thickness ZM40.

#### 2.3 COMPONENTS

- A. Comply with ANSI/ASHRAE 90.1.
- B. Primary Vertical Girts:

- 1. Profile: Basis of Design; ThermaZee; z-channel, front and back flanges of equal length, with attachment holes.
- 2. Thickness: Minimum 18 gage.
- 3. Web perforations: Minimum 50 percent open area.
- 4. Depth: As indicated in drawings.
- 5. Thermal isolation:
  - a. Located between back flange and substrate; continuous along length of channel.
  - b. Minimum 0.25 inch thickness.
  - c. Thermal conductivity: Less than 0.18 Watts per Meter Kelvin.
  - d. Designed to prevent accumulation of liquid water on upper edge.
- 6. Finish: Mill.

### 2.4 ACCESSORIES

- A. Thermal Insulation: Refer to Section 072703 "Foamed-in-Place Insulation Air Barrier."
- B. Formed Metal Walls Panels: Refer to Section 074213.13 "Formed Metal Wall Panels".
- C. Wall Anchors: Corrosion resistant coated steel; thermally isolated with minimum 1/8 inch thick polymer washer; type, spacing and embedment as system engineer requires.
- D. Bracing, Furring, Bridging, Plates, Gussets, and Clips: Formed sheet steel, thickness to meet structural requirements.
- E. Galvanic Protection: Utilize tapes and other methods to separate and prevent contact between dissimilar metals.

#### PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved engineering calculations.
- B. Place girts no greater than maximum spacings indicated.
  - 1. Girt layout may need to be coordinated with cladding layout and fastening requirements.
  - 2. Components must not be cut while installed on the building unless a shearing instrument is used.
- C. Apply foamed in place insulation as specified in Section 072703 "Foamed-in-place Insulation Air Barrier."
- D. Install formed metal wall panels as specified in Section 074213.13 "Formed Metal Wall Panels".
- 3.2 ADJUSTING

A. Clean and touch up damaged coatings.

END OF SECTION

# SECTION 079200 - JOINT SEALANTS

# PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section Includes:
  - 1. Silicone joint sealants.
  - 2. Urethane joint sealants.
  - 3. Mildew-resistant joint sealants.
  - 4. Butyl joint sealants.
  - 5. Latex joint sealants.
  - 6. Acoustic Joint Sealants
- B. Related Requirements:
  - 1. Section 092900 "Gypsum Board" for sealing perimeter joints sealant
  - 2. Section 093000 "Tiling" for sealing tile joints.

### 1.2 ACTION SUBMITTALS

- A. Product Data:
  - 1. Silicone joint sealants.
  - 2. Urethane joint sealants.
  - 3. Mildew-resistant joint sealants.
  - 4. Butyl joint sealants.
  - 5. Latex joint sealants.
- B. Samples for Initial Selection: Manufacturer's standard color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Joint-Sealant Schedule: Include the following information:
  - 1. Joint-sealant application, joint location, and designation.
  - 2. Joint-sealant manufacturer and product name.
  - 3. Joint-sealant formulation.
  - 4. Joint-sealant color.

#### 1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

- B. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

### 1.4 CLOSEOUT SUBMITTALS

- A. Manufacturers' special warranties.
- B. Installer's special warranties.

### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Authorized representative who is trained and approved by manufacturer.
- B. Testing Agency Qualifications: Qualified in accordance with ASTM C1021 to conduct the testing indicated.

### 1.6 FIELD 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 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: 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 stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
  - 2. Disintegration of joint substrates from 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 SOURCE LIMITATIONS

A. Obtain joint sealants from single manufacturer for each sealant type.

# 2.2 JOINT SEALANTS, 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. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

### 2.3 URETHANE JOINT SEALANTS

- A. Urethane, M, NS, 25, T, NT: Multicomponent, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade NS, Class 25, Uses T and NT.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Bostik; Arkema.
    - b. LymTal International, Inc.
    - c. Master Builders Solutions.
    - d. Pecora Corporation.

# 2.4 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, singlecomponent, nonsag, plus 25 percent and minus 25 percent movement capability, nontrafficuse, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Adfast.
    - b. GE Construction Sealants; Momentive Performance Materials Inc.
    - c. Pecora Corporation.
    - d. Sika Corporation Building Components.
    - e. Soudal USA.
    - f. The Dow Chemical Company.
    - g. Tremco Incorporated.

### 2.5 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Adfast.
    - b. Everkem Diversified Products, Inc.
    - c. Franklin International.
    - d. Pecora Corporation.
    - e. Sherwin-Williams Company (The).
    - f. Tremco Incorporated.

### 2.6 ACOUSTICAL JOINT SEALANTS

- A. 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. Pecora Corporation; AC-20 FTR or AIS-919.
    - b. USG Corporation; SHEETROCK Acoustical Sealant.

#### 2.7 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Adfast.
    - b. Alcot Plastics Ltd.
    - c. Construction Foam Products; a division of Nomaco, Inc.
    - d. Master Builders Solutions.
- B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, 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.

# 2.8 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 performance of the Work.
- 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. Porcelain enamel.
  - d. 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 C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings 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 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 in accordance with 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 in accordance with Figure 8A in ASTM C1193 unless otherwise indicated.

### 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, remove, and repair 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 vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Locations:
    - a. Construction joints in cast-in-place concrete.
    - b. Joints between plant-precast architectural concrete units.
    - c. Control and expansion joints in unit masonry.
    - d. Joints between metal panels.
    - e. Joints between different materials listed above.
    - f. Perimeter joints between materials listed above and frames of doors, windows and louvers.
    - g. Other joints as indicated.
  - 2. Urethane Joint Sealant: Multicomponent, nonsag,, Class 25.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Locations:
    - a. Control and expansion joints on exposed interior surfaces of exterior walls.
    - b. Perimeter joints of exterior openings where indicated.
    - c. Tile control and expansion joints.

- d. Vertical joints on exposed surfaces of walls and partitions.
- e. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
- f. Other joints as indicated.
- 2. Joint Sealant: Latex.
- 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
  - 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.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Location:
    - a. Acoustical joints at interior "acoustical" sound walls at penetrations of and terminations of walls where sound could escape to adjacent rooms (i.e. offices).
    - b. Other joints as indicated.
  - 2. Joint Sealant: Acoustical.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

#### END OF SECTION 079200

# SECTION 081113 - 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:
  - 1. Standard and custom hollow metal frames.
- B. Related Sections:
  - 1. Division 01 Section "General Conditions".
  - 2. Division 08 Section "Flush Wood Doors".
  - 3. Division 08 Section "Door Hardware".
  - 4. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.
- C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
  - 1. ANSI/SDI A250.8 Recommended Specifications for Standard Steel Doors and Frames.
  - 2. ANSI/SDI A250.4 Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
  - 3. ANSI/SDI A250.6 Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
  - 4. ANSI/SDI A250.10 Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
  - 5. ANSI/SDI A250.11 Recommended Erection Instructions for Steel Frames.
  - 6. ASTM A1008 Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
  - 7. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 8. ASTM A924 Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
  - 9. ASTM C 1363 Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
  - 10. ANSI/BHMA A156.115 Hardware Preparation in Steel Doors and Frames.
  - 11. ANSI/SDI 122 Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
  - 12. ANSI/NFPA 80 Standard for Fire Doors and Fire Windows; National Fire Protection Association.
  - 13. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.

- 14. NFPA 252 Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
- 15. UL 10C Positive Pressure Fire Tests of Door Assemblies.
- 16. UL 1784 Standard for Air Leakage Tests of Door Assemblies.

# 1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- C. Fire-Rated Door Assemblies: 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 UL10C (neutral pressure at 40" above sill) or UL 10C.
  - 1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
  - 2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
  - 3. Smoke Control Door Assemblies: Comply with NFPA 105.
    - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
- D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.
- E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
  - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

### 1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

#### 1.6 COORDINATION

A. Coordinate installation of anchorages 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.

### 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

### 1.8 ACTION SUBMITTALS

- A. Product Data Submittals: For each product.
  - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.
- B. Shop Drawings: Include the following:
  - 1. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
  - 2. Locations of reinforcement and preparations for hardware.
  - 3. Details of anchorages, joints, field splices, and connections.
  - 4. Details of accessories.
- C. Product Schedule: For hollow-metal doors and frames, 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.

### 1.9 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly for tests performed by a qualified testing agency indicating compliance with performance requirements.
- B. Field quality-control reports.

#### 1.10 CLOSEOUT SUBMITTALS

A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

#### 1.11 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal doors and frames 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 doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 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 steel doors and frames from a SDI Certified manufacturer:
  - 1. CECO Door Products (C).
  - 2. Curries Company (CU).

### 2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

# 2.3 HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.
  - 1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
  - 2. Manufacturers Basis of Design:
    - a. Curries Company (CU) CM Series.
- C. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

### 2.4 FRAME ANCHORS

- A. Jamb Anchors:
  - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
  - 2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
  - 3. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.
- B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.
- C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

### 2.5 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

#### 2.6 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 thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

#### HOLLOW METAL DOORS AND FRAMES

- C. Hollow Metal Frames:
  - 1. Shipping Limitations: 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.
  - 2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
    - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
  - 3. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
  - 4. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
  - 5. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
  - 6. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
  - 7. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches on-center and as follows:
      - 1) Two anchors per jamb up to 60 inches high.
      - 2) Three anchors per jamb from 60 to 90 inches high.
      - 3) Four anchors per jamb from 90 to 120 inches high.
      - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    - b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Three anchors per jamb up to 60 inches high.
      - 2) Four anchors per jamb from 60 to 90 inches high.
      - 3) Five anchors per jamb from 90 to 96 inches high.
      - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
      - 5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
  - 8. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
  - 9. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.
- D. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
  - 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
  - 2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
  - 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
  - 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

# 2.7 STEEL FINISHES

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
  - 1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

# 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. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- C. 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. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.
- E. Verify tolerances against manufacturers installations instructions for tornado and hurricane storm shelter openings.

#### 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 of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
  - 1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
  - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
  - 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
  - 4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
  - 1. Non-Fire-Rated Standard Steel Doors:
    - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
    - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
    - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
  - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

#### 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 and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

# 3.5 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
  - 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

END OF SECTION 081113

# SECTION 081416 - FLUSH WOOD DOORS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Solid-core five-ply flush wood veneer-faced doors for transparent finish.
- B. Related Requirements:
  1. Section 081113 FL Hollow Metal Frames

#### 1.2 ACTION SUBMITTALS

- A. Product Data:
  - 1. Solid-core five-ply flush wood veneer-faced doors and transom panels for transparent finish.
- B. Product Data Submittals: For each product, including the following:
  - 1. Door core materials and construction.
  - 2. Door edge construction
  - 3. Door face type and characteristics.
  - 4. Factory-machining criteria.
- C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:
  - 1. Door schedule indicating door location, type, size, fire protection rating, and swing.
  - 2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
  - 3. Dimensions and locations of blocking for hardware attachment.
  - 4. Dimensions and locations of mortises and holes for hardware.
  - 5. Clearances and undercuts.
  - 6. Requirements for veneer matching.
- D. Samples for Initial Selection: For factory-finished doors.
- E. Samples for Verification:
  - 1. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.
  - 2. Louver blade and frame sections, 6 inches long, for each material and finish specified.
  - 3. Frames for light openings, 6 inches long, for each material, type, and finish required.

# 1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For door inspector.
  - 1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
- B. Field quality-control reports.
- C. Sample Warranty: For special warranty.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Special warranties.
- B. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

#### 1.5 QUALITY ASSURANCE

- A. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies complies with qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:
  - 1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.
- B. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies complies with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:
  - 1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

#### 1.6 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.

#### 1.7 WARRANTY

- 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. Delamination of veneer.
    - b. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.

#### FLUSH WOOD DOORS

- c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
- 2. Warranty also includes 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 PERFORMANCE REQUIREMENTS
  - A. Fire-Rated Wood Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.
- 2.2 FLUSH WOOD DOORS AND FRAMES, GENERAL
  - A. Quality Standard: In addition to requirements specified, comply with AWI/AWMAC/WI's "Architectural Woodwork Standards."
- 2.3 SOLID-CORE FIVE-PLY FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH
  - A. Interior Doors, Solid-Core Five-Ply Veneer-Faced < Insert drawing designation >:
    - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
      - a. Eggers Industries.
      - b. Lambton Doors.
      - c. Oshkosh Door Company.
      - d. VT Industries Inc.
    - 2. Architectural Woodwork Standards Quality Grade: Premium Grade A faces
    - 3. Faces: Single-ply wood veneer not less than 1/50 inch thick.
      - a. Species: Select white maple.
      - b. Cut: Plain sliced
      - c. Match between Veneer Leaves: Book match.
      - d. Assembly of Veneer Leaves on Door Faces: Balance match.
      - e. Room Match:
        - 1) Match door faces within each separate room or area of building.
    - 4. Exposed Vertical and Top Edges: Same species as faces Architectural Woodwork Standards edge Type A

- a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
- b. Fire-Rated Pairs of Doors:
- c. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
  - 1) Screw-Holding Capability: 550 lbf in accordance with WDMA T.M. 10.
- 5. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
  - a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as needed to eliminate through-bolting hardware and as follows:
    - 1) 5-inch top-rail blocking.
- 6. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

#### 2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated.
  - 1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
  - 2. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.
  - 1. Locate hardware to comply with DHI-WDHS-3.
  - 2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
  - 3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.

# 2.5 FACTORY FINISHING

- A. Comply with referenced quality standard for factory finishing.
  - 1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
  - 2. Finish faces, all four edges, edges of cutouts, and mortises.
  - 3. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

- B. Factory finish doors.
- C. Transparent Finish:
  - Architectural Woodwork Standards Grade: Premium

     System-11, Polyurethane, Catalyzed.
  - 2. Staining: Match existing adjacent doors
  - 3. 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 087100 "Door Hardware.
- B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
  - 1. Install fire-rated doors in accordance with NFPA 80.
- 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 FIELD QUALITY CONTROL

- A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.
- B. Inspections:
  - 1. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.
- C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

- D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
- E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

# 3.4 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.

END OF SECTION 081416

# SECTION 084113 - ALUMINUM-FRAMED STOREFRONTS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Storefront framing for punched openings
- B. Related Requirements:
  - 1. Section 014339 "Mockups" for preconstruction laboratory mockup testing.
  - 2. Section 081216 "Aluminum Frames" for interior aluminum framing.

#### 1.2 ACTION SUBMITTALS

- A. Product Data:
  - 1. Aluminum-framed storefront system
- B. Product Data Submittals: For each product.
  - 1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes.
  - 2. Operating characteristics, electrical characteristics, and furnished accessories.
- C. Shop Drawings:
  - 1. Plans, elevations, sections, full-size details, and attachments to other work.
  - 2. Details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
  - 3. Full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed storefront systems, showing the following:
    - a. Joinery, including concealed welds.
    - b. Anchorage.
    - c. Expansion provisions.
    - d. Glazing.
    - e. Flashing and drainage.
  - 4. Connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
  - 5. Signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of exposed finish.

- E. Samples for Verification: Actual sample of finished products for each type of exposed finish.
  - 1. Size: Manufacturers' standard size
- F. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12inch 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.
- G. Delegated Design Submittals: For aluminum-framed storefront systems, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Energy Performance Certificates: For aluminum-framed entrance and storefront systems, accessories, and components, from manufacturer.
  - 1. Basis for Certification: NFRC-certified energy performance values for each aluminumframed entrance and storefront system.
- B. Product Test Reports: For aluminum-framed entrance and storefront systems, for tests performed by a qualified testing agency.
- C. Source Quality-Control Reports: For aluminum-framed entrance and storefront systems.
- D. Field Quality-Control Reports: For aluminum-framed entrance and storefront systems.
- E. Delegated Design Engineer Qualifications: For aluminum-framed entrance and storefront systems.
- F. Sample Warranties: For aluminum-framed entrance and storefront systems.

# 1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For aluminum-framed entrance and storefront systems.

# 1.5 QUALITY ASSURANCE

- A. Installer Qualifications:
  - 1. Authorized representative who is trained and approved by manufacturer.
- B. Delegated Design Engineer Qualifications: A professional engineer who is legally qualified to practice in the **state** where Project is located and who is experienced in providing engineering services of the type indicated.

- C. 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.

# 1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrance and storefront systems 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 caused by thermal movements.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - d. Adhesive or cohesive sealant failures.
    - e. Water leakage through fixed glazing and framing areas.
    - f. Failure of operating components.
  - 2. Warranty Period: 10 years from date of Substantial Completion.
- B. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.
  - 1. Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D 2244.
    - b. Chalking in excess of a No.8 rating when tested in accordance with ASTM D 4214.
    - c. Cracking, peeling, or chipping.
  - 2. Warranty Period: (10) years from date of Substantial Completion.

# PART 2 - PRODUCTS

# 2.1 SOURCE LIMITATIONS

A. Obtain all components of aluminum-framed storefront system, from single manufacturer.

# 2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrance and storefront systems representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
  - 1. Aluminum-framed entrance and storefront systems to withstand movements of supporting structure, including, but not limited to, 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. Deflection exceeding specified limits.
    - c. Glass breakage.
    - d. Noise or vibration created by wind and thermal and structural movements.
    - e. Loosening or weakening of fasteners, attachments, and other components.
    - f. Failure of operating units.
- B. Structural Loads:
  - 1. Wind Loads: As indicated on Drawings.
  - 2. Other Design Loads: As indicated on Drawings
- C. Deflection of Framing Members Supporting Glass: At design wind load, as follows:
  - 1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane shall not exceed L/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, whichever is less.
  - 1. Deflection Parallel to Glazing Plane: Limited to L/360 of clear span or 1/8 inch, whichever is smaller.
    - a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.
- D. Structural: Test in accordance with ASTM E330/E330M as follows:
  - 1. When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance doors, do not evidence deflection exceeding specified limits.
  - 2. When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including entrance doors and 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.
- E. Water Penetration under Static Pressure: Test in accordance with ASTM E331 as follows:
  - 1. No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested in accordance with a minimum static-air-pressure

differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.

- F. Energy Performance: Certified and labeled by manufacturer for energy performance as follows:
  - 1. Thermal Transmittance (U-factor):
    - a. Fixed Glazing and Framing Areas: U-factor for the system of not more than 0.41 Btu/sq. ft. x h x deg F as determined in accordance with NFRC 100 and the Virginia Energy Conservation Code.
  - 2. Solar Heat-Gain Coefficient (SHGC):
    - a. Fixed Glazing and Framing Areas: SHGC for the system of not more than 0.25 as determined in accordance with NFRC 200 and the Virginia Energy Conservation Code.
  - 3. Air Leakage:
    - a. Fixed Glazing and Framing Areas: Air leakage for the system of not more than 0.06 cfm/sq. ft. (0.30 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. when tested in accordance with ASTM E283.
  - 4. Condensation Resistance Factor (CRF):
    - a. Fixed Glazing and Framing Areas: CRF for the system of not less than 35 as determined in accordance with AAMA 1503.
- G. Noise Reduction: Test in accordance with ASTM E90, with ratings determined by ASTM E1332, as follows.
  - 1. Outdoor-Indoor Transmission Class: Minimum 26.
- H. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
  - 2. Interior Ambient-Air Temperature: 75 deg F.

# 2.3 ALUMINUM-FRAMED STOREFRONT SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Arcadia, Inc.
  - 2. Arch Aluminum & Glass Co., Inc.
  - 3. EFCO Corporation.
  - 4. Kawneer Company, Inc.; Arconic Corporation.
  - 5. TRACO
  - 6. Trulite Glass & Aluminum Solutions, LLC.

- 7. Tubelite Inc.
- 8. U.S. Aluminum; C.R. Laurence Co., Inc.; CRH Americas, Inc.
- 9. YKK AP America Inc.
- B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
  - 1. Exterior Framing Construction: Thermally broken
  - 2. Glazing System: Retained mechanically with gaskets on four sides.
  - 3. Glazing Plane: Center at exterior locations
  - 4. Finish: Painted, High-performance organic finish
  - 5. Fabrication Method: Field-fabricated stick system.
  - 6. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
  - 7. Steel Reinforcement: As required by manufacturer.
- C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

#### 2.4 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.
- D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

#### 2.5 MATERIALS

- A. Sheet and Plate: ASTM B209.
- B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.

# 2.6 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.

#### ALUMINUM-FRAMED STOREFRONTS

- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
- C. 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.
- D. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- E. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.

# 2.7 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 interior.
  - 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. After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

# 2.8 ALUMINUM FINISHES

- A. High-Performance Organic Finish, Two-Coat PVDF: Fluoropolymer finish complying with AAMA 2604 and containing not less than 50 percent PVDF resin by weight in color coat.
  - 1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 2. Color and Gloss: Match Existing.
    - a. Submit sample to architect for verification

# 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 INSTALLATION OF ALUMINUM-FRAMED STOREFRONT SYSTEMS

- A. Comply with manufacturer's written instructions.
- B. Do not install damaged components.
- C. Fit joints to produce hairline joints free of burrs and distortion.
- D. Rigidly secure nonmovement joints.
- E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- F. Seal perimeter and other joints watertight unless otherwise indicated.
- G. 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.
- H. Set continuous sill members and flashing in full sealant bed, as specified in Section 079200 "Joint Sealants," to produce weathertight installation.
- I. Install joint filler behind sealant as recommended by sealant manufacturer.
- J. Install components plumb and true in alignment with established lines and grades.
- K. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.
- L. Install glazing as specified in Section 088000 "Glazing."

#### 3.3 ERECTION TOLERANCES

A. Install aluminum-framed entrance and storefront systems to comply with the following maximum tolerances:

#### ALUMINUM-FRAMED STOREFRONTS

- 1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
- 2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
- 3. Alignment:
  - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
  - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
  - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
- 4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

# 3.4 FIELD QUALITY CONTROL

- 1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect to be tested in accordance with AAMA 501.2 and to not evidence water penetration.
  - a. Perform a minimum of three (3) tests in areas as directed by Architect.

# END OF SECTION 084113

#### SECTION 087100 - DOOR HARDWARE

#### 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 commercial door hardware for the following:
  - 1. Swinging doors.
- B. Door hardware includes, but is not necessarily limited to, the following:
  - 1. Mechanical door hardware.
  - 2. Cylinders specified for doors in other sections.
- C. Related Sections:
  - 1. Division 08 Section "Hollow Metal Doors and Frames".
  - 2. Division 08 Section "Flush Wood Doors".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
  - 1. ANSI A117.1 Accessible and Usable Buildings and Facilities.
  - 2. ICC/IBC International Building Code.
  - 3. NFPA 70 National Electrical Code.
  - 4. NFPA 80 Fire Doors and Windows.
  - 5. NFPA 101 Life Safety Code.
  - 6. NFPA 105 Installation of Smoke Door Assemblies.
  - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
  - 1. ANSI/BHMA Certified Product Standards A156 Series.
  - 2. UL10C Positive Pressure Fire Tests of Door Assemblies.
  - 3. ANSI/UL 294 Access Control System Units.
  - 4. UL 305 Panic Hardware.
  - 5. ANSI/UL 437- Key Locks.

# 1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
  - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
  - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
  - 3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    - e. Explanation of abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for door hardware.
    - g. Door and frame sizes and materials.
    - h. Warranty information for each product.
  - 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- D. Informational Submittals:
  - 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

# 1.4 CLOSEOUT SUBMITTALS

- A. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.
- B. Project Record Documents: Provide record documentation of as-built door hardware sets in digital format (.pdf, .docx, .xlsx, .csv) and as required in Division 01, Project Record Documents.

# 1.5 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware 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.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
  - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
- F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
  - 1. Function of building, purpose of each area and degree of security required.
  - 2. Plans for existing and future key system expansion.
  - 3. Requirements for key control storage and software.

- 4. Installation of permanent keys, cylinder cores and software.
- 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
  - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
  - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
  - 3. Review sequence of operation narratives for each unique access controlled opening.
  - 4. Review and finalize construction schedule and verify availability of materials.
  - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

# 1.6 DELIVERY, STORAGE AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

# 1.7 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

#### 1.8 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
  - 1. Structural failures including excessive deflection, cracking, or breakage.
  - 2. Faulty operation of the hardware.
  - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 4. Electrical component defects and failures within the systems operation.
- C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

# PART 2 - PRODUCTS

#### 2.1 BUTT HINGES

- A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
  - 1. Quantity: Provide the following hinge quantity:
    - a. Two Hinges: For doors with heights up to 60 inches.
    - b. Three Hinges: For doors with heights 61 to 90 inches.
    - c. Four Hinges: For doors with heights 91 to 120 inches.
    - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
  - 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
    - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
    - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
  - 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
    - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
    - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
  - 4. Hinge Options: Comply with the following:

- a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.
- 5. Manufacturers:
  - a. Hager Companies (HA) BB Series, 5-knuckle.
  - b. McKinney (MK) TA/T4A Series, 5-knuckle.
  - c. dormakaba BEST (ST) F/FBB Series, 5-knuckle.

# 2.2 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
  - 1. Manufacturers:
    - a. Sargent Manufacturing (SA).
- B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
  - 1. Threaded mortise cylinders with rings and cams to suit hardware application.
  - 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
  - 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
  - 4. Tubular deadlocks and other auxiliary locks.
  - 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
  - 6. Keyway: Match Facility Standard.
- C. Keying System: Each type of lock and cylinders to be factory keyed.
  - 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
  - 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
  - 3. Existing System: Field verify and key cylinders to match Owner's existing system.
- D. Key Quantity: Provide the following minimum number of keys:
  - 1. Change Keys per Cylinder: Two (2)
  - 2. Master Keys (per Master Key Level/Group): Five (5).
  - 3. Construction Keys (where required): Ten (10).
- E. Construction Keying: Provide construction master keyed cylinders.
- F. Key Registration List (Bitting List):

- 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
- 2. Provide transcript list in writing or electronic file as directed by the Owner.

# 2.3 MORTISE LOCKS AND LATCHING DEVICES

- A. Mortise Locksets, Grade 1 (Heavy Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions and features as specified herein.
  - 1. Manufacturers:
    - a. Corbin Russwin Hardware (RU) ML2000 Series.
    - b. Sargent Manufacturing (SA) 8200 Series.
    - c. Schlage (SC) L9000 Series.

# 2.4 CYLINDRICAL LOCKS AND LATCHING DEVICES

- A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed cylindrical locksets. Listed manufacturers shall meet all functions and features as specified herein.
  - 1. Manufacturers:
    - a. Corbin Russwin Hardware (RU) CLX3300 Series.
    - b. Sargent Manufacturing (SA) 10X Line.
    - c. Schlage (SC) ND Series.

#### 2.5 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
  - 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: Provide manufacturer's special strike box fabricated for aluminum framing.
  - 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
  - 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
  - 2. Strikes for Bored Locks and Latches: BHMA A156.2.
  - 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
  - 4. Dustproof Strikes: BHMA A156.16.

### 2.6 SURFACE DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
  - 1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
  - 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
  - 3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
  - 4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
  - 5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
  - 6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
  - 1. Heavy duty surface mounted door closers shall have a 30-year warranty.
  - 2. Manufacturers:
    - a. LCN Closers (LC) 4040 Series.
    - b. Norton Rixson (NO) 7500 Series.
    - c. Sargent Manufacturing (SA) 351 Series.

# 2.7 ARCHITECTURAL TRIM

- A. Door Protective Trim
  - 1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
  - 2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

- 3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
- 4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:
  - a. Stainless Steel: 300 grade, 050-inch thick.
- 5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
- 6. Manufacturers:
  - a. Rockwood (RO).

#### 2.8 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
  - 1. Manufacturers:
    - a. Hiawatha, Inc. (HI).
    - b. Rockwood (RO).
    - c. Trimco (TC).

# 2.9 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
  - 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

- 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
  - 1. National Guard Products (NG).
  - 2. Pemko (PE).
  - 3. Reese Enterprises, Inc. (RE).

#### 2.10 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

#### 2.11 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

# PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

#### 3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

#### 3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
  - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
  - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
  - 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
  - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
  - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and 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 work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
- E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- F. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

#### 3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

# 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.

# 3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

#### 3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

# 3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
  - 1. Quantities listed are for each pair of doors, or for each single door.
  - 2. The supplier is responsible for handing and sizing all products.
  - 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
  - 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

# B. Manufacturer's Abbreviations:

1.	MK - McKinney
2.	SA - SARGENT
3.	RO - Rockwood

# **Hardware Sets**

#### Set: 1.0

# Doors: 105A

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Storeroom Lock	FW 21 10XG04 LP	US26D	SA
1	Surface Closer	351 O/P10 (TO SUIT)	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Door Stop	403/441CU (TO SUIT)	US26D	RO
3	Silencer	608/609 (TO SUIT)		RO

# <u>Set: 2.0</u>

# Doors: 107A, 108A, 109A, 110A, 122A, 125A

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Office Lock	FW 21 10XG05 LP	US26D	SA
1 Door Stop	403/441CU (TO SUIT)	US26D	RO
3 Silencer	608/609 (TO SUIT)		RO

# Set: 3.0

# Doors: 105C

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Privacy Lock	V21 8265 LNP	US26D	SA
1	Surface Closer	351 O/P10 (TO SUIT)	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Mop Plate	K1050 4" CSK	US32D	RO
1	Door Stop	403/441CU (TO SUIT)	US26D	RO
3	Silencer	608/609 (TO SUIT)		RO
1	Coat Hook	RM802	US32D	RO

END OF SECTION 087100

# PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Glass products.
  - 2. Insulating glass.
  - 3. Glazing sealants.
  - 4. Glazing tapes.
  - 5. Miscellaneous glazing materials.
- B. Related Requirements:
  - 1. Section 084113 Aluminum Framed Entrances and Storefronts

#### 1.2 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 in accordance with ASTM C1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.

#### 1.3 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances to achieve proper safety margins for glazing retention under each design load case, load case combination, and service condition.

# 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of the following products; 12 inches square.
  - 1. Insulating glass.
- C. Glazing Accessory Samples: For sealants in 12-inch lengths. Install sealant Samples between two strips of material representative in color of adjoining framing system.

- 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 qualified professional engineer responsible for their preparation.

# 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, manufacturers of fabricated glass units, glass testing agency and] sealant testing agency.
- B. Product Test Reports: For fabricated glass and glazing sealants, for tests performed by a qualified testing agency.
  - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- C. Preconstruction adhesion and compatibility test report.
- D. Sample Warranties: For special warranties.

# 1.6 QUALITY ASSURANCE

- A. Fabricated-Glass Manufacturer Qualifications: A qualified manufacturer of fabricated glass units who is approved and certified by primary glass manufacturer.
- B. Installer Qualifications: A qualified glazing contractor for this Project who is certified under the North American Contractor Certification Program (NACC) for Architectural Glass & Metal (AG&M) contractors.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.

# 1.7 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 C1087 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 eight (8) 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 use of specially formulated primers.

# 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials in accordance with 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.

#### 1.9 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 40 deg F.

#### 1.10 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 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 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. Source Limitations for Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

# 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 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 014000 "Quality Requirements," to design glazing.
- C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined in accordance with the IBC and ASTM E1300:
  - 1. Design Wind Pressures: Determine design wind pressures applicable to Project in accordance with ASCE/SEI 7, based on heights above grade indicated on Drawings.
    - a. Basic Wind Speed: 110 mph
    - b. Importance Factor: 1.15
    - c. Exposure Category: C
  - 2. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual gas lites.
  - 3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-ofglass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
- D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- E. 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 laminated-glass lites, properties are based on products of construction indicated.
  - 2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
  - 3. U-Factors: Center-of-glazing values, in accordance with NFRC 100 and based on most current non-beta version of LBL's WINDOW computer program, expressed as Btu/sq. ft. x h x deg F.
  - 4. SHGC and Visible Transmittance: Center-of-glazing values, in accordance with NFRC 200 and based on most current non-beta version of LBL's WINDOW computer program.
5. Visible Reflectance: Center-of-glazing values, in accordance with 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. 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 the IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than thickness indicated.
  - 1. Minimum Glass Thickness for Exterior Lites: 1/4 inch.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heatstrengthened float glass, or fully tempered float glass **as** needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heatstrengthened 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 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified in accordance with ASTM E2190.
  - 1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants..
  - 2. Perimeter Spacer: Manufacturer's standard spacer material and construction.
    - a. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
      - 1) <u>Technoform</u>.
      - 2) <u>Thermix; a brand of Ensinger USA</u>.

### 2.5 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. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range of industry colors.
- B. Neutral-Curing Silicone Glazing Sealant, Class 100/50: Complying with ASTM C920, Type S, Grade NS, Use NT.
  - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
    - a. <u>GE Construction Sealants; Momentive Performance Materials Inc</u>.
    - b. <u>Pecora Corporation</u>.
    - c. <u>Sika Corporation</u>.
    - d. <u>The Dow Chemical Company</u>.
    - e. <u>Tremco Incorporated</u>.

### 2.6 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 C1281 and AAMA 800
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800

# 2.7 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by 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:
  - 1. Elastomeric material with Shore A durometer hardness of 85, plus or minus 5.
  - 2. Type recommended in writing by sealant or glass manufacturer.

# D. Spacers:

- 1. Neoprene blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- 2. Type recommended in writing by sealant or glass manufacturer.
- E. Edge Blocks:
  - 1. Elastomeric material with Shore A durometer hardness per manufacturer's written instructions.
  - 2. Type recommended in writing by sealant or glass manufacturer.

### 2.8 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: 120 deg F ambient; 180 deg F, material surfaces

# 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 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 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 in accordance with 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 in writing 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 in writing 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 in writing 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 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 INSULATING GLASS SCHEDULE

- A. Clear Insulating Glass Type "A"
  - 1. Basis-of-Design Product: Vitro Solarban 67 Solar Control Low-e Series, Clear + Clear
  - 2. Overall Unit Thickness: 1 inch.
  - 3. Minimum Thickness of Each Glass Lite: <sup>1</sup>/<sub>4</sub> inch
  - 4. Outdoor Lite: Clear fully tempered float glass
  - 5. Indoor Lite: Clear fully tempered float glass
  - 6. Visible Light Transmittance: 54 percent minimum
  - 7. Winter Nighttime U-Factor: 0.42 maximum
  - 8. Solar heat Gain Coefficient: .30 maximum
  - 9. Safety glazing required.

END OF SECTION 088000

# SECTION 092216 - NON-STRUCTURAL METAL FRAMING

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Framing systems.
  - 2. Suspension systems.

#### 1.2 ACTION SUBMITTALS

- A. Product Data:
  - 1. Framing systems.
  - 2. Suspension systems.
  - 3. Grid suspension systems.

### 1.3 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of code-compliance certification for studs and tracks.
- B. Evaluation Reports: For embossed, high-strength steel studs and tracks post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Notify manufacturer of damaged materials received prior to installation.
- B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI S202, "Code of Standard Practice for Cold-Formed Steel Structural Framing."

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

A. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, in accordance with ASTM E90 and classified in accordance with ASTM E413 by an independent testing agency.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C754 for conditions indicated.
  - 1. Steel Sheet Components: Comply with ASTM C645 requirements for steel unless otherwise indicated.
  - 2. Protective Coating: ASTM A653/A653M, G40, hot-dip galvanized unless otherwise indicated.
- B. Studs and Tracks: ASTM C645. Use either conventional steel studs and tracks or embossed, high-strength steel studs and tracks.
  - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
    - a. <u>CEMCO; California Expanded Metal Products Co</u>.
    - b. <u>ClarkDietrich</u>.
    - c. <u>Custom Stud</u>.
    - d. Jaimes Industries.
    - e. MBA Building Supplies.
    - f. MRI Steel Framing, LLC.
    - g. <u>Marino\WARE</u>.
    - h. <u>Phillips Manufacturing Co.</u>
    - i. <u>SCAFCO Steel Stud Company</u>.
    - j. <u>Steel Construction Systems</u>.
    - k. <u>Steel Network, Inc. (The)</u>.
    - 1. <u>Telling Industries</u>.
  - 2. Minimum Base-Steel Thickness: 0.0296 inch.
  - 3. Depth: As indicated on Drawings.
  - 4. Embossed, High Strength Steel Studs and Tracks: Roll-formed and embossed with surface deformations to stiffen the framing members so that they are structurally comparable to conventional ASTM C645 steel studs and tracks.
    - a. Minimum Base-Steel Thickness: .022 inch.
- C. Slip-Type Head Joints: Where indicated, provide the following:
  - 1. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
  - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
    - a. <u>ClarkDietrich</u>.
    - b. MBA Building Supplies.
    - c. MRI Steel Framing, LLC.

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- d. <u>Marino\WARE</u>.
- e. <u>SCAFCO Steel Stud Company</u>.
- f. <u>Steel Construction Systems</u>.
- g. <u>Steel Network, Inc. (The)</u>.
- 2. Minimum Base-Steel Thickness: 0.0296 inch.
- E. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-steel thickness, with minimum 1/2-inch- wide flanges.
  - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
    - a. <u>ClarkDietrich</u>.
    - b. <u>MBA Building Supplies</u>.
    - c. MRI Steel Framing, LLC.
    - d. <u>Marino\WARE</u>.
    - e. <u>SCAFCO Steel Stud Company</u>.
    - f. <u>Steel Construction Systems</u>.
  - 2. Depth: 1-1/2 inches
  - 3. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.
- F. Hat-Shaped, Rigid Furring Channels:
  - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
    - a. <u>ClarkDietrich</u>.
    - b. Jaimes Industries.
    - c. <u>MBA Building Supplies</u>.
    - d. <u>MRI Steel Framing, LLC</u>.
    - e. <u>Marino\WARE</u>.
    - f. <u>SCAFCO Steel Stud Company</u>.
    - g. <u>Steel Construction Systems</u>.
  - 2. Minimum Base-Steel Thickness: 0.0296 inch
  - 3. Depth: As indicated on Drawings.
- G. Knee Wall Brace
  - 1. Kneewall or approved equal
  - 2. Application: at all half-height wall locations.
  - 3. Size and spacing: As indicated on drawings.

# 2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
- B. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.

- C. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch (1.367 mm) and minimum 1/2-inch- (13-mm-) wide flanges.
  - 1. Depth: 1-1/2 inches.
- D. Furring Channels (Furring Members):
  - 1. Hat-Shaped, Rigid Furring Channels: ASTM C645, 7/8 inch deep.
    - a. Minimum Base-Steel Thickness: 0.0296 inch.

# 2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
  - 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

# PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
  - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

# 3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C754.
  - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

# 3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
  - 1. Single-Layer Application: 16 inches o.c..
  - 2. Multilayer Application: 16 inches o.c..
- B. Install studs so flanges within framing system point in same direction.
- C. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
  - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
  - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
    - a. Install two studs at each jamb unless otherwise indicated.
    - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
  - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
  - 4. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- D. Direct Furring:
  - 1. Screw to wood framing.
  - 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

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#### 3.5 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
  - 1. Hangers: 48 inches o.c.
  - 2. Carrying Channels (Main Runners): 48 inches o.c.
  - 3. Furring Channels (Furring Members): 16 inches o.c.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
    - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
  - 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  - 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  - 5. Do not attach hangers to steel roof deck.
  - 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
  - 7. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Interior gypsum board.
- B. Related Requirements:
  - 1. Section 061600 "Sheathing" for gypsum sheathing for exterior walls.
  - 2. Section 079219 "Acoustical Joint Sealants" for acoustical joint sealants installed in gypsum board assemblies.
  - 3. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.
  - 4. 093013 "Ceramic Tiling" for tile backing panels

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Gypsum wallboard.
  - 2. Interior trim.
  - 3. Joint treatment materials.
- B. Shop Drawings: Show locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work.

#### 1.3 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.

# 1.4 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, 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, 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.

# PART 2 - PRODUCTS

#### 2.1 SOURCE LIMITATIONS

A. Obtain each type of gypsum panel and joint finishing material from single source with resources to provide products of consistent quality in appearance and physical properties.

### 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. Gypsum Wallboard: ASTM C1396/C1396M.
  - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
    - a. <u>American Gypsum</u>.
    - b. Armstrong Ceiling & Wall Solutions.
    - c. <u>CertainTeed; SAINT-GOBAIN</u>.
    - d. <u>Continental Building Products Inc</u>.
    - e. <u>Georgia-Pacific Gypsum LLC</u>.
    - f. Gold Bond Building Products, LLC provided by National Gypsum Company.
    - g. <u>PABCO Gypsum</u>.
    - h. <u>USG Corporation</u>.
  - 2. Thickness: 5/8 inch (12.7 mm).
  - 3. Long Edges: Tapered
- B. Mold-Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces.
  - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
    - a. <u>American Gypsum</u>.
    - b. <u>CertainTeed; SAINT-GOBAIN</u>.
    - c. <u>Continental Building Products Inc</u>.
    - d. <u>Georgia-Pacific Gypsum LLC</u>.
    - e. Gold Bond Building Products, LLC provided by National Gypsum Company.
    - f. <u>PABCO Gypsum</u>.
    - g. <u>USG Corporation</u>.

- 2. Core: 5/8 inch (12.7 mm), regular type
- 3. Long Edges: Tapered.
- 4. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.

### 2.4 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047.
  - 1. Material: Galvanized of aluminum coated steel sheet or rolled zinc
  - 2. Shapes:
    - a. Cornerbead.
    - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
    - c. Expansion (control) joint.
    - d. Curved-Edge Cornerbead: With notched or flexible flanges.

### 2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C475/C475M.
- B. Joint Tape:
  - 1. 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.
  - 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

# 2.6 AUXILIARY MATERIALS

- A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

- C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
  - 1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
  - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Acoustical Sealant: As specified in Section 079200 "Joint Sealants."

# PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- 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 INSTALLATION AND FINISHING OF PANELS, GENERAL

- A. Comply with ASTM C840.
- 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 1/16 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. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. 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 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 1/4- to 3/8-inch wide joints to install sealant.

- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. 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 C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

# 3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
  - 1. Wallboard Type: As indicated on Drawings.
  - 2. Mold-Resistant Type: At all Restroom Locations
- B. 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.
  - 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 stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
  - 3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
  - 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

# 3.4 INSTALLATION OF 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. Control Joints: Install control joints in accordance with ASTM C840 and in specific locations approved by Architect for visual effect.

- C. Interior Trim: Install in the following locations:
  - 1. Cornerbead: Use at outside corners unless otherwise indicated.
  - 2. LC-Bead: Use at exposed panel edges.
  - 3. Curved-Edge Cornerbead: Use at curved openings.

### 3.5 FINISHING OF 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 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 in accordance with ASTM C840:
  - 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 099123 "Interior Painting."

### 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 092900

### SECTION 093013 - CERAMIC 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. Glazed wall tile.
  - 2. Tile backing panels.
  - 3. Crack isolation membrane.
  - 4. Metal edge strips.
- B. Related Requirements:
  - 1. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
  - 2. Section 092400 "Cement Plastering" for scratch coat for thickset mortar setting-bed installations.
  - 3. Section 092900 "Gypsum Board" for cementitious backer units.

#### 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 its "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 ACTION SUBMITTALS

A. Product Data: For each type of product.

#### CERAMIC TILING

- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Verification:
  - 1. Full-size units of each type and composition of tile and for each color and finish required. For porcelain mosaic tile in color blend patterns, provide full sheets of each color blend.
  - 2. Full-size units of each type of trim and accessory for each color and finish required.
  - 3. Metal edge strips in 6-inch lengths.

### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: For each type of product.
- D. Product Test Reports: For tile-setting and -grouting products and certified porcelain tile.

#### 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
  - 2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

# 1.7 QUALITY ASSURANCE

- A. Installer Qualifications:
  - 1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
  - 2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
  - 3. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.

# 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 tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

### 1.9 FIELD 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 MANUFACTURERS

- A. Source Limitations for Tile: Obtain tile from single 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 single manufacturer and each aggregate from single source or producer.
  - 1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:
  - 1. Crack isolation membrane.
  - 2. Cementitious backer units.
  - 3. Metal edge strips.

### 2.2 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.
- 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 TCNA 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.
  - 1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

# 2.3 TILE PRODUCTS

- A. Ceramic Tile Type CT1, Glazed wall tile.
  - 1. <u>Manufacturers</u>: 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. <u>American Marazzi Tile, Inc</u>.
    - b. <u>American Olean; a division of Dal-Tile Corporation</u>.
    - c. <u>Crossville, Inc</u>.
    - d. <u>Daltile</u>.
    - e. <u>Interceramic</u>.
  - 2. Module Size: 4 by 4 inches.
  - 3. Face Size Variation: Rectified.
  - 4. Thickness: 5/16 inch.
  - 5. Face: Plain with modified square edges.
  - 6. Finish: Bright, opaque glaze.
  - 7. Tile Color and Pattern: As indicated on drawings.
  - 8. Grout Color: As indicated on drawings.
  - 9. 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 for Thinset Mortar Installations: Straight, module, bullnose and sanitary cove size 4 by 4 inches.
    - b. Wainscot Cap for Thinset Cement Mortar Installations: Bullnose cap, module size 4 by 4 inches.

- c. External Corners for Thinset Mortar Installations: Surface bullnose, same size as adjoining flat tile.
- d. Internal Corners: Field-butted square corners. For coved base and cap use angle pieces designed to fit with stretcher shapes.

### 2.4 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, Type A, in maximum lengths available to minimize end-to-end butt joints.
  - 1. Thickness: 5/8 inch.

### 2.5 CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fabric-Reinforced, Modified-Bituminous Sheet: Self-adhering, modified-bituminous sheet with fabric reinforcement facing; 0.040-inch nominal thickness.
  - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
    - a. <u>MAPEI Corporation</u>; Mapelastic SM with Mapeguard.
    - b. <u>National Applied Construction Products, Inc</u>.
    - c. StrataFlex.

### 2.6 SETTING MATERIALS

- A. Latex-Portland Cement Mortar (Thinset): ANSI A118.4.
  - 1. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
  - 2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

### 2.7 GROUT MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.
- B. Water-Cleanable Epoxy Grout: ANSI A118.3.
  - 1. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F, respectively, and certified by manufacturer for intended use.

# 2.8 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cementbased formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metal base, designed specifically for flooring or wall applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.
- C. 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.

#### 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 the Work.
  - 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 thinset 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 thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. 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 CERAMIC TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA 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 TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
- 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. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
- F. 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. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
  - 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.

- 3. 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.
- G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
  - 1. Glazed Wall Tile: 1/16 inch.
- H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- I. 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.
- J. Metal Edge Strips: Install where exposed edge of the wall meets wall substrate.

### 3.4 TILE BACKING PANEL INSTALLATION

A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated.

#### 3.5 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 that is bonded securely to substrate.
- B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

#### 3.6 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  - 1. Remove 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.

# 3.7 **PROTECTION**

- A. 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.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

### 3.8 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

- A. Interior Wall Installations, Masonry or Concrete:
  - 1. Ceramic Tile Installation W202I-11: TCNA W202 I-11; thinset mortar.
    - a. Ceramic Tile Type: CT1.
    - b. Thinset Mortar: Latex-portland cement mortar.
    - c. Grout: Water-cleanable epoxy grout.
    - d. Locations for use: Restrooms.

END OF SECTION 093013

# SECTION 095113 - ACOUSTICAL PANEL CEILINGS

# PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

# 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
  - 1. Acoustical Panels: Set of 6-inch-square Samples of each type, color, pattern, and texture.
  - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch-long Samples of each type, finish, and color.
  - 3. Clips: Full-size hold-down clips.

# 1.3 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. Ceiling suspension-system members.
  - 2. Structural members to which suspension systems will be attached.
  - 3. Method of attaching hangers to building structure.
    - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
  - 4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
  - 5. Size and location of initial access modules for acoustical panels.
  - 6. Items penetrating finished ceiling and ceiling-mounted items including the following:
    - a. Lighting fixtures.
    - b. Diffusers.
    - c. Grilles.

- d. Speakers.
- e. Sprinklers.
- f. Access panels.
- g. Perimeter moldings.
- 7. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.
- 8. Minimum Drawing Scale: 1/8 inch = 1 foot.
- B. Qualification Data: For testing agency.
- C. Product Test Reports: For each acoustical panel ceiling, for tests performed by a qualified testing agency.
- D. Evaluation Reports: For each acoustical panel ceiling suspension system, from ICC-ES.
- E. Field quality-control reports.

# 1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

# 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. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
  - 2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
  - 3. Hold-Down Clips: Equal to 2 percent of quantity installed.

# 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site 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.

### 1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, 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 MANUFACTURERS

A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Verify ceiling products comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Verify formaldehyde emissions do not exceed 16.5 mcg/cu. m or 13.5 ppb, whichever is less.
- B. Verify ceiling products comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Verify formaldehyde emissions do not exceed 16.5 mcg/cu. m or 13.5 ppb, whichever is less.
- C. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: Class A according to ASTM E1264.
  - 2. Smoke-Developed Index: 50 or less.

# 2.3 ACOUSTICAL PANELS (ACT1)

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Armstrong Ceiling & Wall Solutions; Armstrong No. 2878 Calla. (Basis of Design)
  - 2. CertainTeed LLC; Saint-Gobain North America.
  - 3. USG Corporation.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

- C. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.
- D. Classification: Provide panels as follows:
  - 1. Type and Form: Type A, mineral based fiber with factory applied latex paint, Form 2.2 wet felted.
  - 2. Pattern: G (smooth).
- E. Color: White.
- F. Light Reflectance (LR): Not less than 0.85.
- G. Ceiling Attenuation Class (CAC): Not less than 35.
- H. Edge/Joint Detail: Square.
- I. Thickness: 1 inch.
- J. Modular Size: 30 by 60 inches.
- K. Antimicrobial Treatment: Manufacturer's standard broad spectrum, 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 D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.

#### 2.4 ACOUSTICAL PANELS (SAPC1)

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Armstrong Ceiling & Wall Solutions; Armstrong No. 2820 Calla. (Basis of Design)
  - 2. CertainTeed LLC; Saint-Gobain North America.
  - 3. USG Corporation.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- C. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.
- D. Classification: Provide panels as follows:
  - 1. Type and Form: Type A, mineral based fiber with factory applied latex paint, Form 2.2 wet felted.
  - 2. Pattern: G (smooth).

- E. Color: White.
- F. Light Reflectance (LR): Not less than 0.85.
- G. Ceiling Attenuation Class (CAC): Not less than 35.
- H. Edge/Joint Detail: Square.
- I. Thickness: 1 inch.
- J. Modular Size: 24 by 24 inches.
- K. Antimicrobial Treatment: Manufacturer's standard broad spectrum, 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 D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.

### 2.5 METAL SUSPENSION SYSTEM

- A. Manufacturers: Subject to compliance with requirements, provide metal suspension system, 15/16 Inch Wide, Exposed Tee System or comparable product by one, but not limited to, of the following:
  - 1. Armstrong Ceiling & Wall Solutions; Prelude XL. (Basis of Design)
  - 2. CertainTeed LLC; Saint-Gobain North America.
  - 3. USG Corporation.
- B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- C. Wide-Face, Capped, Double-Web, Fire-Rated, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 (Z90) coating designation; with prefinished 15/16-inch-wide metal caps on flanges.
  - 1. Structural Classification: Intermediate-duty system.
  - 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
  - 3. Face Design: Flat, flush.
  - 4. Cap Material: Cold-rolled steel.

# 2.6 ACCESSORIES

A. Hold-Down Clips: Manufacturer's standard hold-down.

### 2.7 METAL EDGE MOLDINGS AND TRIM

- A. Manufacturers: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Armstrong World Industries, Inc.; Prelude 11/16 Inch Exposed Tee Grid (Basis of Design)
  - 2. CertainTeed LLC; Saint-Gobain North America.
  - 3. USG Corporation.
- 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. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
  - 2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

# 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 unless otherwise indicated and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

### 3.3 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C636/C636M and manufacturer's written instructions.
  - 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 and, if permitted with fire-resistance-rated ceilings, 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 to structure 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. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, post installed mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
  - 7. 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.
  - 8. Do not attach hangers to steel deck tabs.
  - 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  - 10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
  - 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- 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 post installed 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 16 inches o.c. and not more than 3 inches from ends. 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 precise fit.
  - 1. Arrange directionally patterned acoustical panels as follows:
    - a. As indicated on reflected ceiling plans.
    - b. Install panels with pattern running in one direction parallel to [long] [short] axis of space.
    - c. Install panels in a basket-weave pattern.
  - 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
  - 3. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
  - 4. Install hold-down clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.
    - a. Hold-Down Clips: Space 24 inches o.c. on all cross runners.
  - 5. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

# 3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
  - 1. Periodic inspection during the installation of suspended ceiling grids according to ASCE/SEI 7.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- C. Perform the following tests and inspections of completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages and when installation of
ceiling suspension systems on each floor has reached 20 percent completion, but no panels have been installed. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.

- 1. Within each test area, testing agency will select one of every 10 power-actuated fasteners and post installed anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every two post installed anchors used to attach bracing wires to concrete and will test them for 440 lbf of tension.
- 2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
- D. Acoustical panel ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

# 3.5 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.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

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# SECTION 096513 - 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. Thermoplastic rubber base.
  - 2. Rubber molding accessories.
- B. Related Sections:
  - 1. Section 096519 "Resilient Tile Flooring" for rubber tile and vinyl composition tile flooring.

# 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.
- C. 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 12 inches long.
- D. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

#### 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 10 linear feet for every 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 50 deg F or more than 90 deg F.

#### 1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 85 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 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.
- 1.7 WARRANTY
  - A. Limited 2-year warranty for rubber base.

#### PART 2 - PRODUCTS

# 2.1 THERMOPLASTIC-RUBBER BASE (RB1)

- 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. AB; American Biltrite.
  - 2. Armstrong World Industries, Inc.
  - 3. Burke Mercer Flooring Products, Division of Burke Industries Inc.
  - 4. Flexco.
  - 5. Johnsonite; A Tarkett Company.
  - 6. Mondo Rubber International, Inc.
  - 7. Roppe Corporation, USA.
  - 8. VPI, LLC, Floor Products Division.
- B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).
  - 1. Group: I (solid, homogeneous).
  - 2. Style and Location: Style B, Cove.

#### **RESILIENT BASE AND ACCESSORIES**

- 3. Thickness: 0.125 inch.
- 4. Height: 4 inches.
- 5. Lengths: Coils in manufacturer's standard length.
- 6. Outside Corners: Job formed.
- 7. Inside Corners: Job formed.
- 8. Colors: As indicated on Drawings.

# 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 Corporation.
  - 3. Johnsonite: A Tarkett Company.
- B. Description: Rubber reducer strip for resilient flooring transition strips.
  - 1. Profile and Dimensions: As indicated on Drawings.
  - 2. Locations: Provide rubber molding accessories in areas indicated.
  - 3. Colors and Patterns: As indicated on Drawings.

# 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. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Job-Formed Corners:
  - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
    - a. Form without producing discoloration (whitening) at bends.
  - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
    - a. Miter or cope corners to minimize open joints.

### 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.
  - 2. Sweep and vacuum horizontal surfaces thoroughly.
  - 3. Damp-mop horizontal surfaces to remove marks and soil.
- 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. Floor Polish: To be provided and installed by Owner.
- E. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

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# SECTION 096519 - 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. Rubber floor tile.
  - 2. Moisture Mitigation for 100% of floor area for resilient tile flooring.
- B. Related Sections include the following:
  - 1. Section 090561.13 "Moisture Vapor Emission Control" for epoxy moisture management system installed on ground floor concrete slabs to suppress excessive moisture vapor emissions prior to installation of resilient flooring.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
  - 1. Show details of special patterns.
- C. Samples for Verification: Full-size units of each color and pattern of floor tile required.
- D. Product Schedule: For floor tile. Use same designations indicated on Drawings.

#### 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 fifty (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 68 deg F or more than 80 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 70 deg F or more than 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 55 deg F or more than 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.

#### 1.10 WARRANTY

A. Manufacturer's Warranty: Flooring products are warranted to be free from defects in materials and workmanship within the specified team after the installation date, when installed and maintained in accordance with Manufacturer's recommendations

1. Warranty period: Fifteen (15) years from date of substantial completion.

# PART 2 - PRODUCTS

# 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 and ASTM E 662 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
  - 2. Fire Test Data Flame Spread: 0.45 watt/cm<sup>2</sup> or more Class I.
  - 3. Fire Test Data and Smoke Evolution, 450 or less.
- B. FloorScore Compliance: Resilient tile flooring shall comply with the requirements of FloorScore certification.
- C. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Chemical Resistance: No more than slight change in surface dulling attack or staining. Meet or exceed ASTM F 925.
- 2.2 RUBBER FLOOR TILE (RT1, RT2, RT3, RT4, RT5, RT6, RT7)
  - A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - 1. Johnsonite; a Tarkett company.
    - 2. Mannington Mills, Inc.
    - 3. Nora Systems, Inc.
    - 4. Roppe Corporation; Roppe Holding Company.
  - B. Tile Standard: ASTM F1344, Class I-B, Homogeneous Rubber Tile, through mottled.
  - C. Hardness: Grade 2, minimum hardness of 70 measured using Shore, Type A durometer according to ASTM D2240.
  - D. Wearing Surface: Textured.
  - E. Thickness: 0.140 inches.
  - F. Size: 39.53 by 39.53 inches.
  - G. Colors and Patterns: As indicated by manufacturer's designations on drawings.

# 2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, ortland 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 9.9 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 relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 90 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.
- F. Moisture-Vapor-Emission-Control Membrane: Install according to manufacturer's written instructions on **100% of 1**<sup>st</sup> **floor** concrete slab surface to receive resilient tile flooring.

### 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 in pattern indicated.
- 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 direction alternating in adjacent tiles (basket-weave pattern).
- 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. Cover floor tile until Substantial Completion.

END OF SECTION 096519

### SECTION 096723 - RESINOUS FLOORING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Resinous flooring.
  - 2. Integral cove base accessories.

# 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include manufacturer's technical data, installation instructions, and recommendations for each resinous flooring component required.
- B. Samples for Verification: For each resinous flooring system required and for each color and texture specified, 6 inches square, applied to a rigid backing by Installer for this Project.

# 1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Material Certificates: For each resinous flooring component.
- C. Material Test Reports: For each resinous flooring system, by a qualified testing agency.
- D. Field quality-control reports.

# 1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For resinous flooring to include in maintenance manuals.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
  - 1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

# 1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

### 1.7 FIELD CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring installation.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring installation.
- C. Close spaces to traffic during resinous flooring installation and for 24 hours after installation unless manufacturer recommends a longer period.

# PART 2 - PRODUCTS

# 2.1 PERFORMANCE REQUIREMENTS

- A. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Flammability: Self-extinguishing in accordance with ASTM D635.

# 2.2 BACKER PANELS

- A. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, Type A, 1/4" thick, in maximum lengths available to minimize end-to-end butt joints.
- B. Fiber-Cement Backer Board: ASTM C 1288, 1/4" thick, in maximum lengths available to minimize end-to-end butt joints.

#### 2.3 RESINOUS FLOORING

- A. Resinous Flooring System: Abrasion-, impact-, and chemical-resistant, aggregate-filled, resinbased monolithic floor surfacing designed to produce a seamless floor and integral cove base.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin Williams/Dur-A-Flex **Hybri-Flex EC** or comparable product by one of the following:
    - a. Sherwin-Williams/Dur-A-Flex High Performance Flooring: Hybri-Flex EC
    - b. Key Resin Company

- c. Stonhard, Inc.
- B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.
- C. System Characteristics:
  - 1. Color and Pattern: As indicated on Drawings.
  - 2. Wearing Surface: Orange-peel texture.
  - 3. Overall System Thickness: 3/16" inch.
- D. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested in accordance with test methods indicated:
  - 1. Compressive Strength: 6,926 minimum in accordance with ASTM C579.
  - 2. Tensile Strength: 944 minimum in accordance with ASTM C307.
  - 3. Flexural Modulus of Elasticity: 1,909 minimum in accordance with ASTM C580.
  - 4. Water Absorption: 0.1 percent maximum in accordance with ASTM C413.
  - 5. Shrinkage: Nil / 0.0 percent maximum in accordance with ASTM C531.
  - 6. Impact Resistance: No chipping, cracking, or delamination and not more than 1/16-inch permanent indentation in accordance with MIL-D-3134J.
  - 7. Resistance to Elevated Temperature: No slip or flow of more than 1/16 inch in accordance with MIL-D-3134J.
  - 8. Abrasion Resistance: 51 mgs maximum weight loss in accordance with ASTM D4060.
  - 9. Hardness: 85, Shore D in accordance with ASTM D2240.
  - 10. Critical Radiant Flux: 0.45 W/sq. cm or greater in accordance with NFPA 253.
- E. Waterproofing Membrane: Type recommended in writing by resinous flooring manufacturer for substrate and resinous flooring system indicated.
- F. System Products:
  - a. Heavy Duty Environment (Decorative Flake Broadcast): Hybri-Flex EC
    - 1) Primer (Optional for Outgassing/Porous Substrate): Poly-Crete TF Plus or Resuflor Aqua 3477
    - 2) Slurry: Poly-Crete SL; 6750/6755 Flake Broadcast to excess
    - 3) Bonding Coat, Broadcast: Resuflor 3746; 6750/6755 Flake Broadcast to excess.
    - 4) Flake Size: Standard blend of 1/16, 1/8, or 1/4 inch.
    - 5) Grout: Resuflor 3746.
    - 6) Topcoat: Resutile HPS 100 Gloss Urethane.

# 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 resinous flooring systems.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Prepare and clean substrates in accordance with resinous flooring manufacturer's written instructions for substrate indicated to ensure adhesion.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
  - 1. Roughen concrete substrates as follows:
    - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
    - b. Comply with requirements in SSPC-SP 13/NACE No. 6, with a Concrete Surface Profile of 3 or greater in accordance with ICRI Technical Guideline No. 310.2R, unless manufacturer's written instructions are more stringent.
  - 2. Repair damaged and deteriorated concrete in accordance with resinous flooring manufacturer's written instructions.
  - 3. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
    - a. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 85 percent relative humidity level measurement.
  - 4. Alkalinity and Adhesion Testing: Perform tests recommended in writing by resinous flooring manufacturer. Proceed with installation only after substrate alkalinity is not less than 6 or more than 8 pH unless otherwise recommended in writing by flooring manufacturer,
- C. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates in accordance with manufacturer's written instructions.

- 1. Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring in accordance with manufacturer's written instructions.
- D. Resinous Materials: Mix components and prepare materials in accordance with resinous flooring manufacturer's written instructions.
- E. If moisture tests are high than Manufacturer's recommended range, perform moisture mitigation system. Moisture mitigation system to be approved by Manufacturer and Architect.

# 3.3 INSTALLATION

- A. Apply components of resinous flooring system in accordance with manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness specified.
  - 1. Coordinate installation of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
  - 2. Cure resinous flooring components in accordance with manufacturer's written instructions. Prevent contamination during installation and curing processes.
  - 3. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.
- B. Primer: Apply primer over prepared substrate at spreading rate recommended in writing by manufacturer.
- C. Waterproofing Membrane: Apply waterproofing membrane over entire substrate surface, as required by Manufacturer, in thickness recommended in writing by manufacturer.
- D. Integral Cove Base Accessories: Adhesively install precast accessories before applying flooring coats and in accordance with manufacturer's written instructions.
- E. Field-Formed Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring coats. Apply in accordance with manufacturer's written instructions and details, including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.
  - 1. Integral Cove Base: 6 inches high.
  - 2. Provide metal trim cap (MT1) as indicated on Drawings.
- F. Self-Leveling Body Coats: Apply self-leveling slurry body coats in thickness specified for flooring system.
  - 1. Aggregates: Broadcast aggregates at rate recommended in writing by manufacturer. After resin is cured, remove excess aggregates to provide surface texture indicated.
- G. Troweled or Screeded Body Coats: Apply troweled or screeded body coats in thickness specified for flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel marks and roughness using method recommended in writing by manufacturer.

- H. Grout Coat: Apply grout coat to fill voids in surface of final body coat.
- I. Topcoats: Apply topcoats in number indicated for flooring system specified, at spreading rates recommended in writing by manufacturer, and to produce wearing surface specified.

# 3.4 FIELD QUALITY CONTROL

- A. Material Sampling: Owner may, at any time and any number of times during resinous flooring installation, require material samples for testing for compliance with requirements.
  - 1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
  - 2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
  - 3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reinstall flooring materials to comply with requirements.

# 3.5 **PROTECTION**

A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION 096723

# SECTION 099124 - INTERIOR PAINTING (MPI STANDARDS)

# PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
  - 1. Concrete.
  - 2. Concrete masonry units (CMUs).
  - 3. Steel.
  - 4. Galvanized metal.
  - 5. Gypsum board.

#### 1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
  - 2. Indicate VOC content.
- B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

- 1. Submit Samples on rigid backing, 8 inches square.
- 2. Apply coats on Samples in steps to show each coat required for system.
- 3. Label each coat of each Sample.
- 4. Label each Sample for location and application area.
- C. Product List: Use same designations indicated on Drawings and in the Interior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.
- D. Coatings Inspection Report: Provide coatings inspection report as completed by authorized representative of selected coatings manufacturer. Report shall include photos of existing site conditions as well as product and surface preparation recommendations for all previously painted substrates.

### 1.4 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 1 gal. of each material and color applied.
- B. Coating Maintenance Manual: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams "Custodian Project Color and Product Information" report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

# 1.5 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 45 deg F.
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage areas daily.

#### 1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than 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, available products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Behr Paint Company; Behr Process Corporation.
  - 2. Benjamin Moore & Co.
  - 3. McCormick Paints.
  - 4. PPG Paints.
  - 5. Sherwin-Williams Company (The) (Basis-of-Design); Matt Smith, Architectural Account Executive; (804)774-1967, matthew.a.smith@sherwin.com.

### 2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products List."
- B. Material Compatibility:
  - 1. Materials for use within each paint system shall be 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, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Material Emissions and Pollutant Control: Verify not less than 85 percent of field-applied paints and coatings that are inside the weatherproofing system comply with one of the following:
  - 1. Low-Emitting Materials: Verify VOC emissions comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Verify formaldehyde emissions do not exceed 9 mcg/cu. m or 7 ppb, whichever is less.
  - 2. Verify VOC content does not exceed limits of authorities having jurisdiction and the following:
    - a. Flat Coatings: 50 g/L.
    - b. Nonflat Coatings: 100 g/L.
    - c. Nonflat High-Gloss Coatings: 150 g/L.
    - d. Dry-Fog Coatings: 150 g/L.
    - e. Industrial Maintenance Coatings: 250 g/L.
    - f. Pretreatment Wash Primers: 420 g/L.
    - g. Primers, Sealers, and Undercoaters: 100 g/L.
    - h. Recycled Coatings: 250 g/L.
    - i. Rust-Preventive Coatings: 250 g/L.

- D. Colors: As indicated on Drawings.
  - 1. Ten percent of surface area will be painted with deep tones.

# 2.3 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. Masonry (Clay and CMUs): 12 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. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
  - 1. Finish surfaces for verification of products, colors and sheens.
  - 2. Finish area designated by Architect.
  - 3. Provide samples that designate primer and finish coats.
  - 4. Do not proceed with remaining work until the Architect approves the mock-up.

- F. Adhesion Test: Apply a test area on all previously painted substrates, allowing paint to dry one week before testing adhesion. If adhesion is poor, additional abrasion of the surface and/or removal of the previous coating may be necessary.
- G. 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 Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and comparable 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.
- 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. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. 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.

# 3.3 INSTALLATION

- 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. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. 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.
- D. Painting Fire-Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
  - 1. Paint the following work where exposed in equipment rooms:
    - a. Equipment, including panelboards and switch gear.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.
    - g. Tanks that do not have factory-applied final finishes.
    - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
  - 2. Paint the following work where exposed in occupied spaces:
  - 3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

# 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. Concrete Substrates, Traffic Surfaces:
  - 1. Water-Based Clear Sealer System: MPI INT 3.2G.
    - a. First Coat: H&C CLARISHIELD Water Based Wet Look Sealer, 50.148154; MPI #99.
    - b. Topcoat: H&C CLARISHIELD Water Based Wet Look Sealer, 50.148154; MPI #99.
  - 2. Water Based Epoxy Floor System:
    - a. Prime Coat: ArmorSeal 8100 Water Based Epoxy Floor Coating Gloss, B70-8100 Series.
    - b. Intermediate Coat: ArmorSeal 8100 Water Based Epoxy Floor Coating Gloss, B70-8100 Series.
    - c. Topcoat: ArmorSeal 8100 Water Based Epoxy Floor Coating Gloss, B70-8100 Series.
    - d. Anti-Slip Additive: ArmorSeal Hi-Wear Additive, B58DQ5240.
- B. CMU Substrates:
  - 1. Institutional Low-Odor/VOC Latex System: MPI INT 4.2E: New, unpainted low traffic wall surfaces.
    - a. Block Filler: PrepRite Block Filler, B25W25 MPI #4.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    - c. Semi-Gloss Topcoat: ProMar 200 HP Zero VOC Latex Semi-Gloss, B31-1950 Series, (Gloss Level 5), MPI #147.
  - 2. Epoxy-modified Latex System: MPI INT 4.2J:

- a. Block Filler: Pro Industrial Heavy Duty Block Filler, MPI #4.
- b. Intermediate Coat: Epoxy-modified latex, matching topcoat.
- c. Topcoat: Pro Industrial Water Based Catalyzed Epoxy, B73-300 (Gloss Level 5), MPI #115.
- C. Steel Substrates:
  - 1. Water Based Dryfall System: MPI INT 5.1C: Exposed ceiling structure.
    - a. Primer: S-W Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series; MPI #107.
    - b. Topcoat: S-W Pro Industrial Waterborne Acrylic Dryfall, B42-80 Series; MPI #118.
  - 2. Water Based Light Industrial System: MPI INT 5.1B:
    - a. Prime Coat: S-W Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series; MPI #107.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    - c. Topcoat: Pro Industrial Acrylic Coating Semi-Gloss, B66-650, (Gloss Level 5), MPI #153.
  - 3. Epoxy-modified Latex System for Handrails: MPI INT 5.1K
    - a. Prime Coat: S-W Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series; MPI #107.
    - b. Intermediate Coat: Epoxy-modified latex, matching topcoat.
    - c. Topcoat: Pro Industrial Water Based Catalyzed Epoxy, B73-300 (Gloss Level 5), MPI #115.
- D. Galvanized-Metal Substrates:
  - 1. Institutional Low-Odor/VOC Latex System: MPI INT 5.3K.
    - a. Prime Coat: Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series, MPI #134.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    - c. Topcoat: Pro Industrial Acrylic Coating Semi-Gloss, B66-650, (Gloss Level 5), MPI #153.
- E. Gypsum Board Substrates:
  - 1. Institutional Low-Odor/VOC Latex System: MPI INT 9.2M:
    - a. Prime Coat: ProMar 200 Zero VOC Primer, B28W2600; MPI #149.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.

- c. Eggshell Topcoat: ProMar 200 HP Zero VOC Latex Eg-Shel, B20-1950 Series; (Gloss Level 3), MPI #145.
- d. Semi-Gloss Topcoat: ProMar 200 HP Zero VOC Latex Semi-Gloss, B31-1950 Series, (Gloss Level 5), MPI #147.

END OF SECTION 099124

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# SECTION 099611 - HIGH-PERFORMANCE COATINGS

# 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 application of high-performance coating systems on the following substrates:
  - a. Ceramic tile.
- B. Related Requirements:1. Section 099123 "Interior Painting" for general field painting.

# 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  - 1. Indicate VOC content.
- B. Samples for Verification: For each type of coating system and each color and gloss of topcoat indicated.
  - 1. Submit Samples on actual substrate material to be coated, 8 inches square.
  - 2. Apply coats on Samples in steps to show each coat required for system.
  - 3. Label each coat of each Sample.
  - 4. Label each Sample for location and application area.
- C. Product List: Use same designations indicated on Drawings and in Interior High-Performance Coating Schedule. Include color designations and product runs (batch numbers).

#### 1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same production run, (batch number) that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - Coatings: 5 percent, but not less than 1 gal. of each material and color applied.

# 1.5 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each coating system indicated to verify preliminary selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  - 1. Architect will select one surface to represent surfaces and conditions for application of each coating system.
    - a. Wall and Ceiling Surfaces: Provide samples of at least 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.

#### 1.6 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 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 coatings only when temperature of surfaces to be coated and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Do not apply exterior coatings in snow, rain, fog, or mist.

# PART 2 - PRODUCTS

# 2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

#### HIGH-PERFORMANCE COATINGS

- 1. Benjamin Moore & Co..
- 2. PPG Paints.
- 3. Sherwin-Williams Company (The).
- 4. Tnemec Inc.

# 2.2 HIGH-PERFORMANCE COATINGS

- A. Material Compatibility:
  - 1. Materials for use within each paint system shall be 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, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
  - 3. Products shall be of same manufacturer for each coat in a coating system.
- B. Colors: As indicated on Drawings.

# 2.3 BLOCK FILLERS

- A. Epoxy Block Filler: Solvent-based, two-component, epoxy, high-solids coating; formulated to bridge and fill porous surfaces of CMUs in preparation for specified intermediate and topcoat coatings:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Benjamin Moore & Co.
    - b. PPG Paints.
    - c. Sherwin-Williams Company (The). (Basis of Design)
    - d. Tnemec Inc.

# 2.4 INTERIOR PRIMERS/SEALERS

- A. Interior Latex Primer Sealer: Pigmented, water-based latex sealer; formulated to reduce porosity of substrate for finish coats; for use on new interior plaster, concrete, and gypsum board surfaces Not intended for use on wood or previously painted surfaces.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Benjamin Moore & Co.
    - b. PPG Paints.
    - c. Sherwin-Williams Company (The).
    - d. Tnemec Inc.

# 2.5 SOURCE QUALITY CONTROL

A. Testing of Coating Materials: Owner reserves the right to invoke the following procedure:

- 1. Owner will engage services of a qualified testing agency to sample coating materials. Contractor will be notified in advance and may be present when samples are taken. If coating 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 coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, both coatings 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. Fiber-Cement Board: 12 percent.
  - 3. Clay Masonry: 12 percent.
  - 4. CMUs: 12 percent.
  - 5. Wood: 15 percent.
  - 6. Gypsum Board: 12 percent.
  - 7. Plaster: 12 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 applicable to substrates and coating systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted.
  - 1. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

- 2. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed.
- 3. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of coatings, 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 coating systems indicated.
- D. Prepare ceramic tile substrates for painting via mechanical abrasion or acid etching to promote adhesion.

# 3.3 APPLICATION

- A. Apply high-performance coatings in accordance with manufacturer's written instructions.
  - 1. Use applicators and techniques suited for coating and substrate indicated.
  - 2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 3. Coat backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  - 4. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.
- D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass 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 coatings for dry film thickness.
  - 1. Contractor shall touch up and restore coated surfaces damaged by testing.
  - 2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written instructions, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written instructions.

### 3.5 CLEANING AND PROTECTION

- A. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- B. Protect work of other trades against damage from coating operation. Correct damage to work of other trades by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
- C. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

### 3.6 INTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. Ceramic Tile Substrates:
  - 1. High Performance Wall System approved for ceramic tile coverage.
    - a. Basis of Design: Sherwin Williams Resuwall (previously known as Saniglaze High Build Wall System)
      - 1) Prime Coat: S-W Extreme Bond Primer, B51W1150.
      - 2) Second Coat: S-W Resuflor Aqua 3479 at 3-5 mils DFT.
      - 3) Third Coat: S-W Resuflor Aqua 3479 at 3-5 mils DFT.
      - 4) Topcoat: S-W Resutile Aqua 4410 at 2-3 mils DFT.

END OF SECTION 099611
## SECTION 220500 - PLUMBING

## PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, Section 230100 "Mechanical General Provisions", and Section 230700 "Mechanical Insulation" apply to this Section.

## 1.2 PERMITS

A. Contractor shall give all required notices and secure all necessary permits. Inspection certificates from local authorities having jurisdiction shall be delivered to the Architect prior to final payment.

## 1.3 GENERAL REQUIREMENTS

- A. Follow Virginia Plumbing Code 2021 and the 2021 Virginia Uniform Statewide Building Code for minimum requirements; where drawings or specifications are at variance with Code, follow whichever provides for maximum size or condition.
- B. Verify all grades, elevations and utility connections before commencing work.
- C. Comply with requirements of the Uniform Federal Accessibility Standards (UFAS).
- D. All pipe, fittings and fixtures that are connected to potable water systems must meet the current Water Drinking Act and where applicable, meet NSF Standard 61 and be so labeled and be so certified. All plumbing valves, devices, fixtures and fittings shall be lead free.

#### 1.4 SUBMITTALS AND SHOP DRAWINGS

- A. Submit manufacturer's data on the following:
  - Plumbing Fixtures Plumbing Fixture Supports Faucets Flush Valves Supplies and Traps Cleanouts Water Hammer Arrestors Valves Mixing Valves ADA Pipe Covers Waterless (Barrier Type) Trap Seal

B. Submit a schedule of all pipe materials to be used for each type of service.

## 1.5 WARRANTY-GUARANTEE

- A. Contractor shall furnish written warranty, countersigned and guaranteed by the General Contractor, stating that work executed under this Section of the Specifications shall be free from defects of materials and workmanship for a period of 12 months from date of Substantial Completion.
- B. During the guarantee period, the Contractor shall repair or replace defective material and workmanship and place same in working order to the satisfaction of the Architect at no additional expense to the Owner.
- C. Contractor shall service the systems for 12 months from date of Substantial Completion. Such service shall include all emergency services and adjustments, except cleaning of filters and screens.

## PART 2 - PRODUCTS

## 2.1 SOIL, WASTE, DRAIN AND VENT PIPING

- A. Underground soil, waste, drain, rain leader and vent piping within the building shall be centrifugally cast, coated Service Weight hub-and-spigot (ASTM A74), hubless cast-iron (ASTM A888), or DWV Schedule 40 PVC pipe (ASTM D2665) and fittings, unless otherwise noted.
- B. Above ground soil, waste, drain, rain leader and vent piping shall be hubless cast-iron pipe (ASTM A888), DWV copper pipe (ASTM B306) or DWV Schedule 40 PVC pipe (ASTM D2665) and fittings, except that PVC pipe shall not be used where piping penetrates fire partitions, or any location not allowed by the Building Code. PVC piping for any service shall not be installed in return air plenums. Cast iron shall be used in plenum spaces above ceilings and return air plenums.
- C. Foam Core PVC piping is not acceptable for any application.
- D. Hub-and-spigot piping shall be assembled using plain-end spigot and positive double-seal elastomeric compression-type gasket joints above ground. Hubless pipe and fittings shall be assembled using Neoprene gasket and stainless-steel retaining sleeve. Underground hubless pipe and fittings shall be assembled per paragraph below. PVC pipe and fittings shall be assembled in strict accordance with manufacturer's instructions. Solvent cement shall conform to ASTM D2564.
- E. Hubless Cast-iron Pipe and Fittings Below Grade: Joints shall be heavy duty, Factory Mutual approved, to FM 1680 Class 1, type 304 stainless-steel couplings with a shield thickness of .024 (24 gauge) with 125 in/lb. worm drive clamps with Neoprene gaskets conforming to ASTM C564. Couplings 1-1/2" to 4" in diameter shall be 3" wide and have

two clamps. Couplings 5" to 10" in diameter shall be 4" wide and have four clamps. Couplings 12" and 15" wide shall be 5-5/8" wide and have six clamps. Model HI-TORQ 125 as manufactured by CLAMP-ALL PRODUCTS, IDEAL CLAMP PRODUCTS, or approved equal.

## 2.2 CLEANING PLUGS AND TEST TEES

- A. Provide cleanouts as indicated and/or required by the Plumbing Code.
- B. Cleanouts shall be the same size as pipe, up to 4". Cleanouts for pipes larger than 4" shall be sized in accordance with the Plumbing Code. Cleanouts installed in connection with cast-iron, hub-and-spigot pipe shall consist of longsweep 1/4 bends or one or two 1/8 bends extended to easily accessible, approved location or where indicated. Extra-heavy cast-brass ferrule with cast-brass cleanout plug shall be caulked into hub of fittings and shall be flush with floor. Cleanouts in connection with threaded pipe shall be cast-iron drainage T-pattern 90-degree branch fittings with extra-heavy brass screw plugs of the same size as pipes, up to and including 4". Install test tees with cast-iron cleanout plugs at foot of soil, waste and drain stacks and on each building drain outside building. Where cleanouts occur on pipe concealed in partitions and walls, provide with chromium-plated cast-brass plate secured to brass plugs. Verify cleanout locations before pipe installation. Extend cleanout plugs to within 1" of finished wall.
- C. See paragraph FIXTURES AND EQUIPMENT for cleanout access covers.

## 2.3 TRAPS

- A. Provide a trap for each fixture and piece of equipment requiring connections to drainage system. Supply traps with fixtures. Place each trap as near fixture as possible and no fixture shall be double trapped. Traps installed on threaded pipe shall be recess drainage pattern. Trap on all floor drains shall be deep-seal type.
- B. Provide waterless (Barrier-type) trap seal devices on floor drains as indicated on plans. Trap seals by GREEN DRAIN, PROSET or approved equal.
- C. Exposed traps and drain piping shall be chromium plated.

## 2.4 WATER PIPING

- A. Water piping shall be copper tubing, Type K, hard-tempered underground and Type L, hard-tempered above ground. Piping shall be assembled with wrought-copper fittings using 95-5 solder above ground and silver solder underground.
- B. Press Connector Fittings:
  - 1. Copper and copper alloy press fittings shall conform to material requirements of ASME B16.18 or ASME B16.22 and NSF/ANSI Standard (NSF 61). Sealing elements for press fittings shall be factory installed EPDM.

- 2. Press-connected fittings 1/2" 2" press end shall have a leak-before-press feature, which assures leakage from inside the system past the sealing element of an unpressed connection. Fittings 2-1/2" 4" press end shall have a factory installed means for visual inspection of completed press. Copper press fitting joints shall be made in accordance with the manufacturer's installation instructions. The tubing shall be fully inserted into the fitting and the tuning marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark in the tubing to ensure the tubing is fully inserted in the fitting. The joints shall be pressed using the pressing tool and jaws or jaw set, approved by the fitting manufacturer. Fitting installer shall be trained by the fitting manufacturer's factory representative.
- 3. Press connected fittings shall be by ELKHART PRODUCTS CORP., NIBCO, VIEGA or approved equal.
- C. Exposed water piping located in finished areas shall be chromium plated or stainless steel where materials are available. For larger pipe sizes, pipe may be painted.

## 2.5 GAS PIPING

- A. Gas piping above ground 1/2" through 2" shall be Schedule 40 black steel screw fabricated using malleable-iron fittings and piping 2-1/2" and over shall be fabricated by welding using Schedule 40 steel welding fittings. Gas piping and fittings exposed to the weather shall be Schedule 40 galvanized steel. Paint all joints in galvanized piping with galvanized paint.
- B. Provide shut-off valves on gas mains, risers and branches where indicated and at connection to all gas-burning equipment.

## 2.6 VALVES

- A. Provide valves on piping as indicated and as required to isolate fixtures and equipment and to give complete control of water in risers and branch lines. Valves shall be ball, unless otherwise indicated. All valves shall be lead-free.
- B. No cast-iron valves shall be used on domestic hot water piping. Valves shall be bronze or brass body valves only.
- C. Valves on copper water piping, up to and including 2", shall be bronze or brass. Valves on cold piping shall have extended shafts to match the pipe insulation thickness to prevent condensation. Catalog numbers indicated are NIBCO. Valves with equivalent characteristics by APOLLO or MILWAUKEE are acceptable.

<u>Type</u>	<u>Size</u>	Catalog Number
Ball	2" and smaller	S-585-80-LF

D. All gas valves 3" and smaller shall be bronze body, threaded with bronze trim ball valves. Gas valves shall be UL-Listed. Valves shall be as manufactured by NIBCO model T-585-70-UL, or approved equal.

## 2.7 MIXING VALVES

- A. Provide complete mixing valves as indicated and scheduled on contract documents. Mixing valves shall meet ASSE standards for intended use as listed below. LEONARD numbers indicated, equal by POWERS or BRADLEY.
  - 1. ASSE 1070: Hand Lavatory

## 2.8 FIXTURES AND EQUIPMENT

- A. Provide complete fixtures and equipment indicated and scheduled on contract documents. Fixtures and equipment shall be as manufactured by the listed manufacturers below or approved equal. The plumbing fixtures listed below are selected to establish examples of design intent and to set a standard of quality. Equivalent fixtures and fittings from other manufactures may be submitted for approval.
  - 1. Vitreous china fixtures shall be as manufactured by KOHLER, AMERICAN STANDARD, or SLOAN.
  - 2. Stainless steel sinks shall be as manufactured by JUST, ELKAY, or ADVANCED TABCO.
  - 3. Sensor activated faucets shall be as manufactured by HYDROTEK, SLOAN, or ZURN.
  - 4. Sensor activated flush Valves shall be as manufactured by HYDROTEK, SLOAN, or ZURN.
  - 5. Drinking fountains and electric water coolers shall be as manufactured by HALSEY TAYLOR, ELKAY, or OASIS.
- B. All material shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.
- C. Provide supply stops as required for all fixtures. Refer to plumbing drawings for additional fixture information.
- D. Provide concealed, floor-mounted, fixture support carriers for all wall-mounted plumbing fixtures, including: water closets, urinals, lavatories and water coolers. Provide floor-mounted supports with concealed arms for wall-hung lavatories. Carriers shall be as manufactured by J. R. SMITH CO., or approved equal. Contractor to select proper model to suit wall construction.
- E. All water coolers and drinking fountains are to be lead-free.
- F. Provide Owner with any special tools required to perform maintenance on fixtures and fittings.

## PART 3 - EXECUTION

## 3.1 PIPE INSTALLATION

#### PLUMBING

A. Grade horizontal soil, waste and drain pipes as follows, except as approved and as indicated on drawings:

2"	1/4" per foot, minimum
3" and larger	1/8" per foot, minimum

- B. Install vertical soil and waste piping where indicated for new fixtures with provision for expansion and extend full size to ceiling space. Where practicable, connect two or more vent pipes together and connect to an existing vent to roof. Run concealed vent pipes in overhead spaces with horizontal waste or soil piping pitched down to stacks without forming traps in pipes, using required fittings. Where an end or circuit vent pipe from fixture or line of fixture is connected to vent line serving other fixtures, make the connection at least 4'0" above the floor on which fixtures are located. Vent lines shall not be used as waste, except as approved. Extend cast-iron hub-and-spigot pipe inside of building 6" above the floor.
- C. Make changes in pipe sizes on soil, waste and drain lines with reducing fittings or recessed reducers. Make changes in direction by appropriate use of 45-degree wyes, longsweep 1/6, 1/8, or 1/16 bends, except sanitary tees may be used where permitted by code in soil and waste lines where change in direction of flow is from horizontal to vertical and on discharge from water closets. Short-radius fittings shall not be permitted, except in approved location.
- D. PVC piping shall not be installed in return-air plenums, through fire walls, or any location not allowed by the Building Code.
- E. Provide pipe sleeves, hangers, supports, and fixture supports. Contractor shall be responsible for proper and permanent location. Pipe shall not be permitted to pass through footings, beams, or ribs. All piping passing through all walls shall be sleeved and insulation shall run continuously through sleeve. Install pipe sleeves and properly secure in place with grout where pipes pass through all walls and at all fire-rated assemblies. Pipe sleeves shall be sufficient diameter to provide approximately 1/4" clearance around insulation or pipe. Fill void between insulation or pipe and sleeve with mineral wool to prevent sound transmission.
- F. Pipe sleeves in walls shall be Schedule 40 steel pipe.

## 3.2 CONNECTIONS TO EQUIPMENT

- A. Make plumbing connections to all equipment requiring connections, including equipment in Contract and equipment furnished by others. Make all connections according to manufacturer's recommendations.
- B. Provide hot water, cold water, waste, vent, piping. Drawings are not intended to be complete in every respect concerning these items. Provide all manufacturer's recommended valves, unions, arrestors, regulators, etc., as required by manufacturer.

## 3.3 FIXTURE SETTING HEIGHTS

A. Plumbing fixtures shall be at heights indicated and/or directed. Heights of handicapped plumbing fixtures shall be as governed by the Building Code, ANSI A117.1 and the requirements of the Uniform Federal Accessibility Standards (UFAS).

## 3.4 INSPECTION AND TESTS

- A. The new plumbing system shall be tested by the Contractor in the presence of the Architect. Governing authorities having jurisdiction shall be notified of test required by them and Final Acceptance of work shall be contingent upon their approval. At least 48 hours' notice shall be given prior to test. All costs of conducting test and furnishing necessary equipment for test shall be borne by the Contractor.
- B. The new soil, waste, drain and vent system shall be tested and proved tight prior to connection of fixtures, by closing all openings, except highest at roof and filling with water to point of overflow. Allow water to stand at least 2 hours before starting inspection. Where piping must be tested in sections to facilitate construction, include at least the upper 10 feet of the preceding section so that no pipe or joint in building will have been subjected to less than 10 feet head of water. Piping laid in trenches shall not be backfilled until test has been made and joints proved tight. Owner shall be provided 24 hours' notice prior to tests and provided written results of tests.
- C. Thoroughly clean and flush piping and apply chlorine solution to new system at least 3 hours to destroy nonspore-forming bacteria. Following chlorination, flush with water from the existing system for 8 hours.
- D. If inspection or tests show defect, replace such defective work or materials and repeat inspection tests. Make repairs to piping with new materials. No caulking of screwed joints or holes shall be acceptable.
- E. Test all gas piping at 50 psig with oil-free compressed air for 2 hours with no loss in pressure.
- F. Clean equipment, pipe, valves and fittings of grease, metal cuttings and sludge accumulated by operations of system for testing. Stoppage or discoloration or other damage to parts of building, its finish or furnishings due to Contractor's failure to properly clean piping system shall be repaired without cost to the Owner.

END OF SECTION 220500

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## SECTION 230100 - MECHANICAL GENERAL PROVISIONS

#### 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.
- B. This Section forms a part of all Division(s) 22 and 23 Sections.

## 1.2 APPLICABLE SPECIFICATIONS, CODES AND STANDARDS

A. Latest effective publications of following Specifications, regulations, standards, codes, etc., as applicable, form a part of these Specifications the same as if written fully herein and shall be followed as minimum requirements.

Codes and ordinances of local governing agencies:

AGA	American Gas Association
AHRI	Air Conditioning, Heating and Refrigeration Institute
AMCA	Air Moving and Conditioning Association
ANSI	American National Standard Institute
ASHRAE	American Society of Heating, Refrigerating and Air-conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
IEEE	Institute of Electrical and Electronics Engineers
NAFM	National Association of Fan Manufacturers
NEC 2020	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
SMACNA	Sheet Metal and Air-conditioning Contractors National Association
UFAS	Uniform Federal Accessibility Standards
UL	Underwriters Laboratories, Inc.
VFSR	Virginia Fire Safety Regulations
VUSBC	Virginia Uniform Statewide Building Code, 2021 Edition

## 1.3 DRAWINGS

A. General arrangements of indicated piping, ductwork and equipment are diagrammatic only, <u>do not scale</u>. Where rearrangement is necessary, submit drawings of proposed changes for approval. Due to scale of drawings, offsets, fittings and accessories may not be indicated. Work indicated, but having details omitted, shall be provided complete to perform function intended without extra cost. Investigate existing structural and finish conditions in building affecting plumbing, heating, ventilating and air-conditioning work, etc., and arrange work accordingly. Furnish fittings, traps, offsets, vents, valves and accessories required. Install equipment in accordance with manufacturer's recommendations and clearance requirements.

## 1.4 COORDINATION

A. Coordinate piping, ducts and equipment with electrical, plumbing, structural, and architectural plans and work in order to avoid omissions and to eliminate any interference. Report in writing discrepancies, if found, to the Engineer as soon as possible after discovery.

## 1.5 WORKMANSHIP

A. Workmanship shall be first class and of best quality in accordance with approved contemporary construction practices. Defective equipment and materials, or material damaged in the course of installation and tests shall be replaced or repaired in an approved manner.

## 1.6 CUTTING

A. Cutting shall be carefully done. Repair damage to the building, piping, wiring, or equipment as a result of cutting for installation, using skilled mechanics of trade involved.

## 1.7 APPROVAL OF MATERIALS, FIXTURES AND EQUIPMENT

- A. See Specification Section 013300 "Submittal Procedures", for shop drawing submittal procedures. Within 30 days after award of the Contract and before any purchases are made, submit for approval a complete list of materials, fixtures and equipment proposed, together with names of manufacturers and catalog numbers for each Specification Section. Furnish other detailed information where directed. No consideration will be given to partial lists submitted from time to time. Approval of materials shall be based on manufacturer's published ratings. Materials, fixtures and equipment listed which are not in accordance with specified requirements shall be rejected. Contractor shall make resubmission of items not approved within 30 days from date of rejections. Submission shall be complete with description, ratings, dimensions and related items and any additional information required by the Engineer.
- B. Materials and equipment shall be new, conforming to these Specifications.
- C. Two or more units of same class of equipment shall be product of single manufacturer; however, component parts of system need not be product of same manufacturer.
- D. Mechanical design has given full consideration to space requirements for equipment specified. Contractor is responsible for selecting equipment that will be accommodated by this space. Equipment not conforming to space allotted shall be rejected.

- E. Mechanical design has given full consideration for electrical requirements for equipment. Contractor is responsible for selecting equipment that will be accommodated by the electrical design indicated. Equipment not conforming to the electrical design provided under Division 26 is the Contractor's responsibility. All electrical changes required to accommodate the equipment provided shall be furnished and installed by the Contractor without change in Contract price or time of completion. This shall include but not be limited to wiring, conduit, circuit breakers, disconnect switches, and controllers.
- F. Submit one copy of equipment installation manuals to the Engineer for their use.

## 1.8 EQUIPMENT DESIGN

A. Equipment and accessories not specifically described or identified by manufacturer's catalog numbers shall be designed in conformity with ASME, ANSI, IEEE, or other applicable technical standards, suitable for maximum working pressure and shall have neat and finished appearance.

#### 1.9 SUPERVISION

A. The Contractor for each Section under this Division shall maintain a competent foreman on the job at all times to supervise the work and coordinate with other trades for the installation of the system. Submit foreman's qualifications, including master's trade license, to the Engineer for approval.

## 1.10 NOTICES AND FEES

A. Give all required notices, obtain all necessary permits and pay all required fees.

#### 1.11 RECORD DRAWINGS

A. Refer to Specification Section 017839 "Project Record Documents".

#### 1.12 OPERATION AND MAINTENANCE MANUALS

A. Refer to Specification Section 017823 "Operation and Maintenance Data".

#### 1.13 OWNER'S TRAINING

A. Upon completion of work and at a time designated by the Owner, the services of competent persons shall be provided as required to instruct Owner's representative in operation and maintenance of systems. Training sessions shall be a combination of on-site and inclassroom training and shall be a minimum of one 4-hour sessions. All training shall be video recorded by the Contractor and provided to the Owner in electronic format.

#### 1.14 WARRANTY-GUARANTEE

- A. Contractor shall furnish written warranty, countersigned and guaranteed by the General Contractor, stating that work executed under this Section of the Specifications shall be free from defects of materials and workmanship for a period of 12 months from date of Substantial Completion.
- B. Contractor shall service the systems for 12 months from date of Substantial Completion. Such service shall include all emergency services and adjustments, except cleaning/changing of filters. Adjustments and repairs to equipment shall be made by the original equipment manufacturer (OEM). Third party service agencies are not acceptable for making repairs or adjustments to equipment during the warranty period.
- C. The equipment manufacturer and Contractor shall provide a one-year material, labor and refrigerant warranty on all compressors. In addition, the manufacturer shall provide a material only warranty on all compressors for a period of 5 years total, beginning at the date of Substantial Completion.
- D. Contractor shall be responsible for all maintenance, repair and servicing of mechanical equipment during the construction and warranty period as required by the equipment manufacturers and identified in the Operation and Maintenance Manuals. This shall include all routine maintenance, such as greasing of bearings, adjustment/replacement of belts, cleaning of coils, calibration of controls and other routine maintenance items that may be unique to each piece of equipment. This shall also include repair and replacement of any malfunctioning or damaged parts. In addition, this shall include changing filters on a biweekly basis through award of Substantial Completion and on a monthly basis during the warranty period. Where pre-filters and final filters are used in a system, the final filters shall only require replacement once, at the end of the warranty period, as long as the pre-filters have been changed as specified. Upon the Owner's observation that this work is not being performed by the Contractor, the Owner will arrange to have these services performed and shall deduct the associated costs from the contract amount or back charge the Contractor for services performed. Monthly service logs shall be forwarded by the Contractor to holders of the operation and maintenance manuals. Contractor shall respond within 24-hour notification by Owner or General Contract.

## PART 2 - PRODUCTS

# 2.1 PIPE SLEEVES, PIPE HANGERS, PIPE SUPPORTS, DUCT SUPPORTS AND FIXTURE SUPPORTS

A. Provide pipe sleeves, hangers, supports, duct supports and fixture supports. Contractor shall be responsible for proper and permanent location. Pipe and duct shall not be permitted to pass through footings, beams, or ribs, unless indicated and/or approved. All piping passing through all walls shall be sleeved and insulation shall run continuously through sleeve. Install pipe sleeves and properly secure in place with grout where pipes pass through all walls and at all fire-rated assemblies. Pipe sleeves shall be sufficient diameter to provide

approximately 1/4" clearance around insulation or pipe. Fill void between insulation or pipe and sleeve with mineral wool to prevent sound transmission.

- B. Hang horizontal overhead runs of pipe with adjustable clevis-type hangers spaced not over 10 feet apart. <u>Hangers shall be zinc plated in all interior spaces</u>.
- C. Gas piping and condensate piping on roof shall be supported by support blocks manufactured by ROOF TOP BLOX model RTB-01, or approved equal. The support blocks shall be designed to eliminate roof penetrations, flashings or damage to roofing membrane. Support body shall be made of recycled UV-resistant Polypropylene Copolymer. Base platform material shall be 1" thick, 25 psi, Type 4 closed cell structural foam to distribute and evenly cushion loads. Support top surface shall have molded in pipe organizing saddles and strut mounting cradle. The top surface shall also have screw guide indents and engineered internal screw thread gripping feature. Block shall accept up to 1/2" threaded rod using side entry nut slots to allow fast top side assembly and piping height adjustments or attachment of galvanized slotted steel strut channel. All support block hardware shall be hot dipped galvanized. Supports for roof mounted gas piping shall be provided with a galvanized roller and collar assembly, "ROL-05" for pipe sizes up to 3", "ROL-06" for pipe sized 4" through 6". For roof mounted piping, provide approved pipe supports every four feet for Polyvinyl Chloride (PVC) and every ten feet for gas piping.
  - 1. For flat roof installations, roof mounted pipe supports shall be installed on 12" x 12" slip sheets matching the roofing material, either white TPO or EPDM. Base of pipe supports shall be adhered to slipsheet using M-1 structural adhesive. Slipsheet shall be adhered to roof surface using adhesive compliant with roof warranty.
- D. Supports for piping, ductwork and equipment shall be attached to a structural member, not bridging. Piping, ductwork and equipment shall not be attached to structural joist bridging or metal roof or floor decking. Provide additional steel supports spanning between joists or beams for hanger attachments. Additional steel supports shall be approved by the Structural Engineer.
- E. In areas supported by steel beams, secure hanger rods directly to beams.
- F. Support and fasten fixtures and equipment in an approved manner.
- G. Ductwork shall be supported in accordance with SMACNA, HVAC Duct Construction Standards, unless otherwise noted or indicated. Ductwork shall be supported using threaded rod or solid metal strap as required by SMACNA. No other materials, such as perforated metal strap, or cloth strap, are acceptable. Wire may be used to hang round duct smaller than 10"; however, solid metal strap shall be used to wrap around duct. Wire shall not be used for rectangular duct or round duct larger than 10".

## 2.2 DUCT AND PIPE PENETRATIONS THROUGH FLOORS, WALLS AND CEILINGS

A. Fit exposed pipes passing through floors, finished walls, or finished ceilings with escutcheon of chromium-plated cast-brass plates on chromium-plated pipe, nickel-plated steel plates on ferrous pipe, or copper tubing. Plates shall be large enough to completely close hole around

pipes and conceal pipe sleeves and shall be round, with least dimension at least 1/2" larger than diameter of pipe and insulation. Secure plates in an approved manner.

B. Fit ductwork passing through walls or ceilings with 22-gauge galvanized sheet-metal sleeves. Sleeves shall be large enough to completely close hole around duct and shall be at least 1/2" larger than outside dimensions of duct and insulation. Provide flanges on both sides of penetrations to cover the wall edge. For uncovered ducts, sleeves shall be of same material as duct. Secure sleeves and flanges in an approved manner.

## 2.3 UNIONS

A. Unions shall be installed on each side of all control valves, regulators and similar items and one side of all pieces of equipment so that such equipment shall be readily disconnected and removed if necessary.

## 2.4 DIELECTRIC CONNECTIONS

A. Dielectric connections shall be provided at all connections between ferrous and nonferrous piping or metals, except drain piping connections at drain pans for cooling coils and valves having cast-bronze adapters.

## 2.5 ELECTRICAL WORK FOR EQUIPMENT UNDER MECHANICAL SYSTEMS

- A. Fractional horsepower motors 1/2 HP and below shall be single-phase, 60 cycles, 120V; motors larger than 1/2 HP shall be 3-phase, 60 cycles, of voltages indicated on the electrical drawings and conforming to the electrical service, except where indicated otherwise. Motors shall conform to latest NEMA requirements.
- B. All electrical power wiring required for equipment installed under Division 23 Sections shall be provided under Division 26 Sections with all necessary approved wiring diagrams and guidance provided under Division 23 Sections, except for power wiring to Automatic Temperature Control panels which shall be provided by Automatic Temperature Control Contractor.
- C. Raceways shall be 1/2" minimum. All wiring in rooms with exposed structure or in inaccessible ceiling and walls shall be installed in conduit. Label the front face of the cover on each junction box with indelible black marker indicating the number of each circuit contained in or running through the box. In areas where exposed construction is the final finished condition and conduit and junction boxes are called out to be painted, label the inside face of the covers.
- D. All control and power wiring required for temperature control system and all interlocking and accessory control wiring required for equipment installed under Division 23 Sections shall be installed by the Plumbing, Mechanical and Temperature Control Contractors.
- E. All controls shall be NEMA rated and NEMA I enclosed where mounted inside building. Controls mounted outside or where specifically called for shall be NEMA3R.

- F. Auxiliary 120-Volt contacts shall be provided to give control and interlocking as required or as indicated.
- G. The Contractor shall be responsible for coordinating with the Division 26 Contractor for providing properly sized circuit breakers to serve equipment and motors furnished which differ from that specified or indicated. This shall be further understood to include branch circuit wiring, conduit, disconnect switches, etc., in accordance with the appropriate codes and specifications. The cost of providing this increased electrical service and related work shall be included under the applicable section under which the equipment and motors are being furnished, at no additional cost to Owner.
- H. The Automatic Temperature Controls Contractor shall be responsible for providing circuit breakers and power wiring and conduit from electrical panels installed under Division 26 to Automatic Temperature Controls panels. All electrical work shall be in accordance with appropriate codes and Division 26 specifications.
- I. The Mechanical Contractor shall be responsible for the installation and mounting of all duct smoke detectors in new and existing ductwork. The duct smoke detector shall be furnished and provided with all fire alarm wiring under Division 28. Any and all Temperature Control wiring shall be provided under Division 23. Refer to the mechanical drawings for locations in new ductwork. Refer to the electrical drawings for locations of existing detectors to be replaced. Coordinate the installation of the detectors with the Electrical and Automatic Temperature Control Contractors.
- J. Short-Circuit Current Rating (SCCR) on HVAC equipment nameplates:
  - 1. The nameplate for all HVAC equipment shall be provided with SCCR in accordance with the National Electric Code (NEC) Article 440.4(B). The SCCR shall meet or exceed the SCCR indicated on the contract documents.
- K. The Mechanical Contractor shall coordinate the following electrical requirements with the Electrical Contractor prior to ordering any equipment:
  - 1. Number of electrical connections
  - 2. Number and size of feeder conductors
  - 3. Number and size of feeders' terminal lugs
  - 4. Maximum overcurrent protection
  - 5. Size and type of fuses

## 2.6 AIR BALANCING DEVICES

A. Furnish any additional material or equipment, such as sheaves, belts, motors and balancing devices, required to complete and/or adjust and balance the systems as recommended by the TAB Agency at no additional cost to the Owner. Failure to provide additional means of adjusting and balancing will not relieve the Contractor of responsibility for properly adjusting and balancing the various systems as intended.

## 2.7 DUCT SEALANT

- A. Where duct is indicated to be sealed, utilize a fire resistive, water based, indoor/outdoor, U.V. resistant, non-fibrated duct sealant, DUCTMATE EverSeal, FOSTER DUCT-FAS 32-19 or approved equal.
- B. Sealant shall have a volatile organic compound (VOC) rating of 24 g/L, less water.
- C. Sealant shall meet all SMACNA pressure classes up to 10" w.g. and SMACNA seal classes A, B and C.
- D. Apply sealant with brush working sealant into all joints. For spiral duct, apply sealant to male end of coupling prior to fitting straight run of duct to coupling. Follow manufacturer's instructions for all application requirements.
- E. The use of duct sealing tape of any kind is unacceptable.

## PART 3 - EXECUTION

## 3.1 PIPE INSTALLATION

- A. Pipe systems shall be complete. Pipe shall be of size indicated or, where not indicated, shall be of size required to produce capacities of the equipment specified. No pipe shall be buried in floors, unless specifically indicated or approved.
- B. Install runs of piping as indicated. Cut pipe accurately to measurements established at the building by the Contractor and work into place without springing or forcing. Do not cut or move any structural portions of the building without approval. Run piping above ground, parallel with lines of buildings, unless otherwise shown or specified.
- C. Thoroughly clean and flush piping in presence of the Engineer, as installed and before automatic vents are installed.
- D. Unless otherwise indicated, connections to equipment shall be as shown by manufacturer's data.
- E. Close pipe openings with caps or plugs during installation. Cover fixtures and equipment tightly and protect against dirt, water and chemical or mechanical injury. Carefully free interior of pipe of superfluous material as work progresses. Upon completion of work, thoroughly clean fixtures, materials and equipment and deliver in approved unblemished condition.
- F. Ream pipe after cutting and before threading and remove burrs. Make screwed joints with graphite and oil or approved graphite compound applied to threads only. Cut threads full and not more than three threads on pipe shall remain exposed. Caulking of threaded joints to stop or prevent leaks will not be permitted. Provide unions where required for disconnection.

- G. Make copper tubing sweat joints with noncorrosive flux and lead-free solder recommended for service encountered or as indicated.
- H. All copper pipe joints shall be made with fittings. Formed bell & spigot couplings and mechanical "T" formed joints are not acceptable.

## 3.2 EQUIPMENT SUPPORTS AND FOUNDATIONS

- A. Design and construct supporting structures of strength to safely withstand stresses to which they may be subjected and to distribute properly the load and impact over building areas. Conform to applicable technical societies' standards, also to codes and regulations of agencies having jurisdiction. Obtain approval before fabrication.
- B. Fasten wall-mounted or ceiling-hung equipment to building structures or inserts as approved.
- C. Provide adequate supports for roof-mounted mechanical equipment. RTU-9 in the Bid Alternate 01 shall be provided with an adapter curb designed to integrate with the existing roof curb flashed into the curb. Coordinate with Architectural drawings for capping requirements of remaining existing roof curb portion that extends beyond the RTU footprint. Supports shall keep equipment clear of roof and transmit weight to roof structure as approved by Structural Engineer.
- D. The Contractor shall submit for review physical data for each unit supported from the building structure, either suspended from or attached to the building structure. The physical data shall include the equipment operating weight, corner weights, and center of gravity.

#### 3.3 NOISE AND VIBRATION

- A. Mechanical and electrical equipment shall operate without objectionable noise or vibration as determined by the Owner.
- B. If such objectionable noise or vibration should be produced and transmitted to occupied portions of building by apparatus, piping, ducts, or other parts of mechanical and electrical work, make necessary changes and additions as approved, without extra cost to the Owner.
- C. Isolators shall prevent, as far as practicable, the transmission of vibration, noise, or hum to any part of building.
- D. Isolators shall suit vibration frequency to be absorbed. Provide isolator units of area and distribution to obtain proper resiliency under load and impact.

#### 3.4 PROTECTION OF EQUIPMENT AND MATERIALS

A. Responsibility for care and protection of mechanical equipment rests with Contractor until Substantial Completion of the work.

- B. After delivery, before and after installation, protect equipment and materials against theft, injury, the environment, or damages from all causes.
- C. Protect plumbing fixtures and other equipment with enamel or glaze surfaces from damage by covering and/or coating as approved.
- D. Protect equipment outlets and pipe openings with temporary plugs or caps.
- E. During construction, seal off all openings into interior of equipment and ductwork with sheet metal or taped polyethylene sheathing to prevent infiltration of dust.
- Temporary (MERV 8) filters shall be provided a minimum of every 14 days for all fans that F. are operated during construction and new (MERV 13) filters shall be installed after all construction dirt has been removed from the building just prior to testing and balancing. Following the testing and balancing, (MERV 13) filters shall be provided a minimum of every 14 days for all fans that are operated during construction. Just prior to Final Completion, all filters shall be replaced with the final filters, with MERV ratings as indicated in the equipment schedules and specifications. Ducts shall be inspected for dust and dirt. Contractor shall provide a signed statement to indicate that new filters for each piece of equipment were installed just before Final Completion. Construction filters shall be removed and not be used as the final set of filters. The contractor shall keep a filter replacement log that includes equipment identifications and dates of filter installation. Log shall be provided to the Engineer and Owner for review on a monthly cycle. Should the Contractor fail to comply with the filter changes as specified, the Owner may, at his discretion, hire through a separate contract the specified filter changes and withhold the cost for this work from the construction contract amount as a back charge to the Contractor.
- G. Provide a spare filter (or sets of filters for equipment that require multiples) for each piece of equipment. Turn filters over to Owner with proper transmittal prior to Final Completion.
- H. Equipment not designed for exterior installation (i.e., variable air volume terminal boxes, ductwork, diffusers, etc.) shall not be delivered to the job site until a location protected from the environment is provided. Location shall be approved by the Architect and Engineer prior to delivery.
- I. Equipment suitable for exterior installation (i.e., rooftop units, roof-mounted exhaust fans, etc.) shall not be delivered to the job site until it is ready to be installed in its permanent location.

# 3.5 CONTRACTOR'S RESPONSIBILITY FOR MANUFACTURER'S AUTHORIZED FIELD START-UP

- A. The equipment manufacturer shall furnish a factory-trained and certified service technician without additional charge to start the HVAC equipment. This individual's certifications shall be submitted as a shop drawing along with the equipment and shall be reviewed and approved by the Engineer. Unit manufacturers shall maintain service capabilities no more than 100 miles from the job site.
- B. The HVAC equipment to be started by the manufacturer's certified technician shall include:

#### MECHANICAL GENERAL PROVISIONS

- 1. Packaged rooftop air conditioning units (Bid Alternate 01 only)
- C. The manufacturer shall furnish complete submittal wiring diagrams of the HVAC equipment as applicable for field maintenance and service.
- D. Start-up sheets on all equipment shall be submitted and reviewed by the engineer. An approved copy shall be included in the final TAB report. If required, this same representative shall be made available to review the startup sheets onsite with the Engineer and Owner.

# 3.6 CONTRACTOR'S RESPONSIBILITY FOR TESTING, ADJUSTING AND BALANCING (TAB)

- A. Provide the TAB Agency a full set of Contract Documents (drawings and technical specifications), all manufacturers' approved submittal data and copies of revised data as soon as possible.
- B. Ensure that a current TAB Engineer's certification certificate is kept on file.
- C. Ensure all systems have been installed and are in 100% working order before the TAB Engineer is called to the job site, including but not limited to ductwork, piping, terminals, electrical and ATC. The Contractor shall verify that each item of the Pre-TAB Checklist (see Appendix A) has been completed and shall deliver a signed copy of the Pre-TAB Checklist to the Owner's Representative and the TAB Agency attesting that the project is complete and ready for TAB work to begin.
- D. Provide adequate access to all points of measurement and adjustment and ensure that all dampers operate freely.
- E. Provide a factory representative for all major pieces of equipment as requested by the TAB Agency to assist in operation and performance verification of equipment.
- F. Cooperate with the TAB Agency to help operate and adjust the control systems directly related to TAB work and provide any specialties required to make such adjustments.
- G. Carefully review the drawings and Specifications for the various systems noting all facilities incorporated in the design for purposes of adjusting and balancing. Should it be deemed necessary to provide additional dampers, baffles, valves, or other devices which would aid in the required adjusting and balancing, same shall be provided by the installing contractor.

#### 3.7 CLEANING, PAINTING AND IDENTIFICATION

- A. Remove from site excess material, equipment protection, etc. Thoroughly clean piping, hangers, equipment, fixtures and trimmings and leave every part in perfect condition ready for use, painting, or insulation as required.
- B. Paint exterior surfaces of equipment supports and other ferrous metal work, except that which is galvanized, with one coat of RUSTOLEUM damp-proof red primer, or approved equal.

- C. Finish painting of exposed piping, ductwork, equipment and insulation in finished spaces shall be done under Section 099900 "Painting".
- D. Water piping service and flow direction shall be indicated with outdoor grade 3.2 mil thick high gloss adhesive backed vinyl labels which identify the service by name (not initials) and the flow direction by arrows. Provide labels similar to Brimar, EZ Pipe Markers with arrow banding tape wrapping the pipe 360° affixed to each end of the pipe identification label. Labels shall be used wherever piping is exposed, except in finished spaces, at all unit connections and at 25-foot intervals for concealed piping located above accessible ceilings. Label and arrow heights shall be proportional to pipe sizes as follows:

Insulated and Un-Insulated	Label
Pipe Size	<u>Heights</u>
Up to 1"	1"
1-1/4" to 2"	2"

E. Provide color-coded identification dots affixed to the ceiling grid for equipment, access doors, terminal equipment controllers, smoke detectors, filters and valves concealed above ceilings. Provide a color-coded chart identifying type of equipment or valve. Chart shall be framed and mounted, under clear plastic and located as directed by Owner.

## 3.8 EQUIPMENT MARKING

- A. Label all mechanical equipment, including control panels, fans, VAV boxes, air-handling units, and thermostats.
- B. Labels shall be machine engraved, laminated, 1/8" thick, Bakelite nameplate type. Labels shall be black faces with white letters.
- C. Labels shall have 1/4" high letters.
- D. Labels shall be rigidly attached using rivets or screws. Adhesive backing is not acceptable.
- E. Thermostat labels shall be a self-adhesive type. Labels shall identify the equipment served by the thermostat.

## APPENDIX A

## PRE-TAB CHECKLIST

#### A. GENERAL

- 1. All components of the HVAC system have been installed, including controls and control wiring.
- 2. Power wiring has been installed and energized to all motorized equipment. Also, all line voltage control wiring required has been installed.
- 3. All equipment has been started and run tested through all specified sequences of operation by factory-authorized representatives and all safety controls have been verified to be operational.
- 4. All required testing of piping and duct systems has been completed in accordance with the drawings and specifications.
- 5. Duct leakage testing, where required, shall be witnessed by the Owner's Representative and/or the TAB Agency. (Bid Alternate 01 only)

## B. AIR DISTRIBUTION AND VENTILATION SYSTEMS

- 1. All air system filters have been replaced with new filters. The air moving equipment, ductwork and air terminals are installed and connected. All air systems are unobstructed and free of debris.
- 2. All manual volume control dampers required are installed and properly connected to adjustment handles. All damper handles are accessible and not covered by insulation or draw bands. All automatic dampers required have been installed with linkages connected and adjusted to provide the specified sequence of operation.
- 3. Access doors have been installed where required to allow inspection and servicing of duct-mounted dampers, equipment and components.
- 4. All ductwork and connections of duct to air terminals have been checked and no visible or audible leakage exists.
- 5. Fans are rotating in correct direction. Fans have been lubricated. Drive pulleys are aligned and belt tension is correct. Setscrews are tight securing keys into key-ways. Fan wheels turn freely and are balanced. Belt guards are in place.
- 6. Vibration isolators and flexible connectors have been installed where required. With fans in operation, there is no excessive vibration of fan assemblies or ductwork.

|--|

(Signature and Title)

(Company)

attest that all items contained in the above Pre-Tab Checklist have been completed

and verified as of this date:\_\_\_\_\_.

## END OF SECTION 230100

MECHANICAL GENERAL PROVISIONS

an authorized representative of

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## SECTION 230500 - HEATING, VENTILATING AND AIR CONDITIONING

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections and Section 230100 "Mechanical General Provisions" apply to this Section.
- B. Refer to Specification Sections 230900 "Automatic Temperature Controls" and the Control Diagrams on the Contract Drawings for additional requirements and coordination between equipment and controls.

## 1.2 WARRANTY-GUARANTEE

A. Contractor shall furnish written warranty, countersigned and guaranteed by the General Contractor, stating that work executed under this Section of the Specifications shall be free from defects of material and workmanship for a period of 12 months from date of Substantial Completion of the building. Refer to Section 230100 for additional warranty period responsibilities.

## 1.3 SUBMITTALS

A. Submit manufacturer's performance data and unit details on all products specified below or indicated on Contract Drawings.

#### 1.4 PROTECTION OF EQUIPMENT AND MATERIAL

A. All equipment and material not specifically designed for exterior installation shall not be delivered to the job site until an indoor, dry location is available for storage. All equipment and material shall be covered and protected from dirt, debris, moisture, paint, coatings, and damage of any kind. Store off the floor, in a location approved by the Owner, to prevent contact with water.

#### PART 2 - PRODUCTS

- 2.1 HEAT GENERATION (NOT USED)
- 2.2 REFRIGERATION (NOT USED)

## 2.3 AIR HANDLING EQUIPMENT

- A. OWNER-FURNISHED, CONTRACTOR-INSTALLED Packaged Rooftop Air Conditioning Unit (RTU-9 Bid Alternate 01 Only)
  - 1. General:
    - a. Install Owner-furnished rooftop air handling unit of size, type and capacity indicated. Unit shall be as manufactured by TRANE.
    - b. Air handlers must be rigged, lifted, and installed in strict accordance with the manufacturer's Installation, Operation, and Maintenance manual and in accordance with these specifications.
    - c. Unit shall be UL and CUL Listed.
    - d. Units may be shipped fully assembled and shall have a minimum of six points of lift. These lift points shall be permanently attached to the unit base and be designed to accept standard rigging devices.
    - e. Air-handling performance data shall be certified in accordance with ARI Standard 430.
    - f. Unit sound performance data shall be rated per ARI Standard 260 and reported as sound power.
  - 2. Unit Construction:
    - a. Unit panels shall be solid double-wall construction. All exterior wall panels shall be made of galvanized steel. The casing shall be able to withstand up to 1.5 times design static pressure, or 8 inches w.g., whichever is less, with no more than 0.005 inch deflection per inch of panel span.
    - b. The unit base design will allow unit to rest on top of roof curb when fieldinstalled. Entire length and width under base will be sealed for additional water management protection.
    - c. Unit shall be factory insulated. Panels and unit roof shall be of double-wall construction with interior and exterior panels and insulation. Panel insulation system shall provide a minimum R value of 12.5. Insulation shall conform to NFPA 90 requirements.
    - d. External surface of unit casing shall be prepared and coated with a minimum 1.5 mil enamel finish able to withstand a salt spray test in accordance with ASTM B117 for a minimum of 500 consecutive hours. Unit casing exterior will be provided with manufacturer's standard color, or alternative color when required.
    - e. Unit roof will be constructed of two pieces. Inner roof will be installed in such a manner as to prevent air bypass between internal components. Outer roof will be sloped a minimum 0.125 inches per foot either from one side of unit to other, or from center to sides of the unit. Roof assembly shall overhang all walls of units by a 2-inch minimum.
    - f. Piping cabinet shall be supplied by the manufacturer (factory-assembled) and shall be of the same construction as the main unit casing. Piping cabinet shall be mounted external to the unit and shipped separate to be field-installed.

- g. All coil sections shall be provided with an insulated, double-wall, galvanized or stainless-steel drain pan. The drain pan shall be sloped in two planes to eliminate stagnant water conditions and to promote positive drainage.
- h. Access doors shall be constructed with a double-wall, solid galvanized steel interior panel. Automotive-style gasketing around the full perimeter of the access door shall be used to prevent air leakage. Door gasketing shall be mounted to the perimeter of the door and shall seal against a raised door frame. Door frame shall channel water away from gasket. Door shall have a protective flange to shield gasket from exposure. Preferred door handle shall not penetrate door casing. Door shall have a single-handle latch.
- i. A tempered glass window for viewing, capable of withstanding unit operating pressures, shall be provided in the door.
- j. A factory-mounted, 120-volt, weather resistant (enclosed and gasketed), ULlisted wet location fluorescent light fixture shall be provided in sections of the unit as specified. Fixture shall be complete with junction box, Lexan housing and lens, magnetic ballast and 70 watt bulb.
- 3. Fans:
  - a. The fan type shall be provided as required for stable operation and optimum energy-efficiency. The fan shall be statically and dynamically balanced at the factory as a complete fan assembly (fan wheel, motor, drive, and belts). The fan shaft shall not exceed 75 percent of its first critical speed at any cataloged speed. Fan wheels shall be keyed to the fan shaft to prevent slipping. The fan shafts shall be solid. The fan section shall be provided with an access door on the drive side of the fan.
  - b. Plenum (Plug) Fan: The fan shall be a single-width, single-inlet, multiblade-type, plenum fan. The fan blades shall be backward-inclined airfoil. Plenum fans shall be equipped with self-aligning, anti-friction, pillow block bearings with an L-50 life of 200,000 hours as calculated per ANSI/AFBMA Standard 9.
  - c. For variable-air-volume applications, airflow shall be modulated by a variable-frequency drive that controls fan speed.
  - d. The fan shall be isolated from the unit casing by a flexible connection. 1-Inch, Seismic Spring Isolators The fan and motor assembly (on sizes 3 to 8) shall be internally isolated from the unit casing with 1-inch (25.3-mm) deflection spring isolators, furnished and installed by the unit manufacturer. The isolation system shall be designed to resist loads produced by external forces, such as earthquakes, and conform to the current requirements for Seismic Zone IV.
  - e. 2-Inch, Seismic Spring Isolators: The fan and motor assembly (on sizes 10 to 100) shall be internally isolated from the unit casing with 2-inch deflection spring isolators, furnished and installed by the unit manufacturer. The isolation system shall be designed to resist loads produced by external forces, such as earthquakes, and conform to the current requirements for Seismic Zone IV.
  - f. Fan motor shall be integrally mounted to an isolated fan assembly furnished by the unit manufacturer. Motor shall be mounted inside the unit casing on an adjustable base to permit adjustment of drivebelt tension. Motor shall be a T-frame, squirrel cage, high-efficiency open drip-proof or totally enclosed fan cooled with size, type and electrical characteristics as shown on equipment schedule. Motors shall comply with NEMA MG-1. High-Efficiency Open Drip-Proof (ODP).

- g. The fan shall have an air measurement system to measure fan airflow directly or measure differential pressure that can be used to calculate fan airflow. The system shall predict airflow within +/-5% accuracy when operating from 45% to 95% wide-open volume. The submitted fan air performance and noise levels shall not be affected by the installation of the device.
- h. Grease Lines: Bearings are selectable with life-time lubrication or with relubrication required. For any bearing requiring relubrication, the grease line shall be extended to the fan-support bracket on the drive side.
- i. Guard Screen: The plenum (plug) fan section shall be provided with an expanded-metal guard screen for the access door.
- j. Inverter test shall be performance to check vibration at unloaded conditions. Fan vibration levels shall be checked from 100 percent to 30 percent of required operating rpm.
- k. Door Guards: Expanded metal screen shall be mounted on door opening to prevent unauthorized entry to fan.
- 4. Coils:
  - a. Coils shall be manufactured by the supplier of the air handling unit. Coils shall be installed such that headers and return bends are enclosed by unit casings. Coils shall be removable by unbolting the wall panels in the coil section. Coil connections shall be clearly labeled on outside of units. Coils shall have aluminum plate fins and seamless copper tubes. Fins shall have collars drawn, belled and firmly bonded to tubes by mechanical expansion of the tubes. Soldering or tinning shall not be used in the bonding process. Fin surfaces shall be cleaned prior to installation in the unit to remove any oil or dirt that may have accumulated on the fin surfaces during manufacturing of the coil. Coil casing shall be a minimum 16-gauge galvanized or stainless steel with formed end supports and top and bottom channels. If two or more coils are stacked in the unit, intermediate drain channels shall be installed between coils to drain condensate to the main drain pans without flooding the lower coils or passing condensate through the airstream of the lower coil.
  - b. Inspection Section: The coil section shall include an inspection section complete with a double-wall, removable door downstream of the coil for inspection, cleaning and maintenance.
  - c. Refrigerant Cooling Coils: Coils shall be proof-tested to one and one-half times the maximum working pressure, and leak tested at maximum working pressure. Test shall be performed air-under-water. After testing, coil circuiting will be air dried, charged with dry nitrogen, and sealed to ensure that circuiting is free of any water or contaminants. Liquid and suction headers shall be constructed of copper and shall penetrate unit casings to allow for sweat connections to refrigerant lines. Coils shall have equalizing vertical distributors sized according to the capacities of the coils.
  - d. Gas Heat: Indirect fired natural gas heaters shall be completely factory assembled, piped, wired, and operationally fire tested at the factory before shipment. The heat exchanger primary drum and secondary tubes shall all be 14-gauge 409 stainless steel. The industrial / commercial burner shall be UL listed, forced draft, and fully modulating. The control panel shall feature Honeywell RM7800 flame management controls and all appropriate safeties. The double wall heater section construction shall match the rest of the unit and bolt together

to form an integral part of the unit. All burner and control components shall be housed in a burner vestibule with a large access door. The entire section shall bear a UL or CUL label for Commercial and Industrial Gas Heating Equipment (ANSI / UL Standard 795) and Industrial Gas Fired Package Units (CGA Standard 3.2-1976).

- 5. Filters:
  - a. Filter sections shall have filter racks, at least one access door for filter removal, and filter block-offs to prevent air bypass around filters. The sections shall be supplied with 2-inch or 4-inch flat, or 2-inch or 4-inch angled filters.
  - b. Throwaway Filters: The filters shall be throwaway-type and shall have 2-inch fiberglass media contained in a rigid frame. Filters shall be capable of operating up to 500-fpm face velocity without loss of filter efficiency and holding capacity. Filters shall have a rigid supporting mesh across the leaving face of the media. (MERV 8 rating).
- 6. Mixing:
  - a. Airflow Measurement Station (Traq<sup>™</sup> Damper): A factory-mounted airflow measurement station shall be provided in the outdoor-air and/or return air opening to measure airflow. The damper blades shall be galvanized steel, housed in a galvanized steel frame and mechanically fastened to a rotating axle rod. The damper shall be rated for a maximum leakage rate of one percent of nominal airflow at one-inch wg. The airflow measurement station shall measure from 15 percent to 100 percent of unit nominal airflow. The airflow monitoring device shall adjust for temperature variations and shall provide a 2 to 10 Vdc signal that corresponds to actual airflow for controlling and documenting airflow. The accuracy of the airflow measurement station shall be ±5 percent.
- 7. Dampers:
  - a. Dampers shall modulate the volume of outdoor, return, or exhaust air. The dampers shall be of double-skin airfoil design with metal, compressible jamb seals and extruded-vinyl blade-edge seals on all blades. The blades shall rotate on stainless-steel sleeve bearings. The dampers shall be rated for a maximum leakage rate of 3 cfm/ft<sup>2</sup> at 1 in. wg and 8 cfm/ft<sup>2</sup> at 4 in. wg. Dampers may be arranged in a parallel or opposed-blade configuration.
- 8. Discharge Plenum Sections: Plenums shall be provided to efficiently turn air and provide sound attenuation.
- 9. Face Damper or Face-and-Bypass Damper: Ultra-low leakage face and bypass dampers shall be provided as scheduled on drawings. Dampers shall be Ruskin CD60 type double-skin airfoil design or equivalent. Damper blades shall be of minimum 14-gauge galvanized steel and damper frames of minimum 16-gauge galvanized steel. Blades shall be of opposed blade action, with metal compressible jamb seals and extruded vinyl blade edge seals. Blades shall rotate on stainless steel sleeve bearings. Face damper and bypass damper shall be mechanically linked together and provide end

driven control shafts. Leakage rate shall not exceed 5 cfm/foot2 at 1-inch wg and 9 cfm/foot2 at 4-inch wg. Damper section shall be supplied with an access door.

- 10. Hoods:
  - a. Inlet: For units with outside air requirements, manufacturer shall provide inlet hood for each outside air damper with high performance moisture eliminator to prevent water carryover into unit casing from outside air. Hoods shall be sized for 100 percent of nominal damper capacities.
  - b. Outlet: Hoods shall be provided on exhaust air openings.
- 11. Exhaust Damper:
  - a. For units supplied with an exhaust fan economizer cycle, a section shall be supplied to house the exhaust damper. Dampers shall be Ruskin CD60 type double-skin airfoil design or equivalent. Damper blades shall be of minimum 14-gauge galvanized steel and damper frames of minimum 16-gauge galvanized steel. Blades shall rotate on stainless steel sleeve bearings. The blades shall rotate on stainless-steel sleeve bearings. The dampers shall be rated for a maximum leakage rate of 5 cfm/ft<sup>2</sup> at 1 in. wg and 9 cfm/ft<sup>2</sup> at 4 in. wg. Section shall be supplied with an access door, and an exhaust hood.
- 12. Unit control board
  - a. Shall accept 20-30 VAC input power, 50/60Hz. 24 VAC nominal.
  - b. Operating temperature range from -40F to 158F; 10-90% RH (non-condensing UI), and -4F to 158F; 10-90% Rh (non- condensing), with a storage temperature range from -40F to 194F; 5-95% RH (non-condensing).
  - c. Shall include an option of and Economizer microprocessor controller which communicates directly with the Unit Control Board and has 8 Analog outputs, 2 Analog inputs, 2 Binary outputs, 3 Binary outputs.
  - d. Controller shall accept the following inputs: space temperature, return air temperature sensor, setpoint adjustment, outdoor air temperature, indoor air quality, outdoor air quality, indoor relative humidity, compressor lock- out, fire/smoke shutdown, single and dual enthalpy, fan status, remote time clock, SA Bus communicated temperature/humidity/CO2 values from Network sensors, FC Bus Network Overrides for space temperature, outdoor air temperature, space humidity, outdoor air quality, Indoor air quality, System purge.
  - e. Shall provide the following outputs: economizer, fan, cooling stage 1, cooling stage 2, heat stage 1, heat stage 2, reversing valve/dehumidify/occupied.
  - f. Unit shall provide surge protection for the controller through a circuit breaker.
  - g. Shall be Internet capable, and communicate at a Baud rate of 38.4K or faster.
  - h. Shall have an LED display independently showing the status of activity on the communication bus, and processor operation.
  - i. Unit shall incorporate a lockout circuit which provides reset capability at the space thermostat or base unit should any of the following standard safety devices trip and shut off compressor. If any of these safety devices trip, the LCD screen will display alarm message indicating the specific safety device that caused the lockout.

- 1) Loss of charge/low-pressure switch
- 2) High pressure switch
- 3) Freeze condition sensor on evaporator coil
- j. Unit control board must support each usage case:
  - 1) Conventional thermostat with low voltage input terminals for easy installation.
  - 2) Communicating network sensors in the occupied space to provide feedback on space conditions for unit control board to compare with associated setpoints.
  - 3) Communication via BACnet MS/TP, Modbus RTU, N2 protocols for integration into a building automation/management system.
- k. Anti-short cycle and low voltage protection features included.
- 1. Internal occupied/unoccupied scheduling.
- m. Unit control board shall permit cooling operation down to a selectable value as low as 0 degrees F.
- n. Shall allow for start-up, commissioning, troubleshooting, parameter adjustment, setpoint adjustment via onboard display and navigable menu with no additional interface tool or controls technician required.
- o. The unit control board shall run a self-test diagnostics algorithm at startup that operated the cooling cycle, heating cycle, fan operation. A status report shall be provided upon completion of the diagnostic self-test.
- Description
  p. Utilize any wi-fi enabled smart device to access the HVAC or multiple HVAC units if communication wiring between them is present (FC Bus or SA Bus). Remote access shall allow complete ability to perform start-up, commissioning, troubleshooting, parameter adjustment, setpoint adjustment.
- q. Local embedded trending and scheduling. Trending data and occupancy scheduling predefined from the factory. Occupancy schedule to be modified via control board joystick menu navigation and remotely using a smart device (cellular phone, laptop, tablet).
- r. A menu on the onboard screen shall display the unit status and allow changing parameters where applicable. These include but are not limited to:
  - 1) Operation setpoint display current value
  - 2) Supply air temperature display current value
  - 3) Return air temperature display current value
  - 4) Operational outside air temperature display current value
- s. A menu shall display and allow modification to the following operations and settings:
  - 1) HVAC zone fan
  - 2) Cooling
  - 3) Heating
  - 4) Economizer
  - 5) Sensors
  - 6) Network

- t. A menu shall display and allow modification to the following operations and settings:
  - 1) HVAC Zone Occupied status
  - 2) Indoor fan status
  - 3) Cooling status
  - 4) Heating status
  - 5) Economizer indication whether free cooling is available or not
- u. A menu shall display and allow modification to the following operations and settings:
  - 1) Firmware version
  - 2) Setting time zone
  - 3) Network information
- v. A menu shall display and allow modification to the following operations and settings:
  - 1) Unit serial number, model number and name
  - 2) Ability to reset lockouts
  - 3) Controller name
  - 4) Displays the current values of all setpoints in use
  - 5) Displays all current values for the indoor and outdoor zones
  - 6) Current values related to indoor fan, cooling, heating, economizer operation, and hot gas reheat.
  - 7) Current information for sensors, coil sensors, thermostat, binary inputs, unit protection, network inputs, and all outputs (relay and binary)
- w. Self-Test
  - 1) A patented self-test system that runs through a series of algorithms to provide a report of all functioning characteristics of the system at time of startup and commissioning.
- 13. Auxiliary Control Boards
  - a. ASHRAE 62- 2001 compliant. BTL certified.
  - b. Economizer controller CEC Title 24 Compliant
    - 1) Display alarms if the following occur:
      - a) Economizer is economizing when conditions do not support.
      - b) Economizer is not economizing when conditions do support.
      - c) Damper stuck.
      - d) Excess outdoor air.
      - e) Failed sensor.

- 2) Refrigeration Fault Detection and Diagnostics
  - a) There is insufficient refrigerant in any circuit.
  - b) There is excessive refrigerant in any circuit.
  - c) There is excessive refrigerant flow.
  - d) There is insufficient refrigerant flow (restriction).
  - e) Inefficient compressor.
  - f) Insufficient high-side heat transfer.
  - g) Excessive high-side heat transfer.
  - h) Insufficient low-side heat transfer.
  - i) Excessive low-side heat transfer.
  - j) Sensor fault The liquid temperature is greater than the condenser temperature (Could also be triggered if refrigerant level is very low in the system).
  - k) Sensor fault Sensor data is not available.
  - 1) The unit is off.
  - m) The ambient temperature is too low.
  - n) The ambient temperature is too high.
  - o) The return air wet-bulb temperature is too low.
  - p) The return air wet-bulb temperature is too high.
  - q) Sensor fault The condensing temperature is lower than the ambient temperature (Could also be triggered when the condenser is wet).
  - r) The suction line temperature is less than the evaporator temperature.
  - s) The evaporator temperature is greater than the ambient temperature.
  - t) The liquid temperature is lower than the ambient temperature.
  - u) Sensor fault Suction temperature or ambient temperature is invalid.
  - v) Sensor fault The return air dry-bulb or wet-bulb temperature is invalid.
  - w) Sensor fault The liquid pressure or suction pressure is invalid.
  - x) Sensor fault The suction line temperature is invalid.
  - y) The return air dry-bulb temperature is too low.
  - z) The return air dry-bulb temperature is too high.
  - aa) The efficiency index is below 75% of ideal.
  - bb) The capacity index is below 75% of ideal.
- 14. Remote accessibility
  - a. ASHRAE 62- 2001 compliant. BTL certified.
  - b. Provide the ability to adjust parameter values, setpoints, limits remotely.
  - c. Connectivity to an Ethernet network via static IP address or Dynamic Name Server (DNS).
- B. OWNER-FURNISHED, CONTRACTOR-INSTALLED Exhaust Fans (Bid Alternate 01 Only)

- 1. Fans shall be Owner-furnished, Contractor-installed of size, type, and capacity as indicated on drawings. Basis of design units are as manufactured by GREENHECK.
- 2. Fans shall be licensed to bear the AMCA Air and Sound Certified Ratings Seal. Fan air performance ratings shall be based on tests conducted in an AMCA registered laboratory for AMCA 210 air performance testing. The Test Standard used shall be ANSI/AMCA Standard 210-85, ANSI/ASHRAE Standard 51-1985, "Laboratory Methods of Testing Fans for Rating." All sizes must be tested, calculations to other sizes not acceptable. Fan sound performance shall be based on tests conducted in an AMCA registered laboratory for AMCA 300 Sound Performance Testing. The Test Standard used shall be AMCA 300 "Reverberant Room Method for Sound Testing of Fans." All sizes must be tested, calculations to other sizes are not acceptable. Air or Sound Test results are to be included in submittal.
- 3. Each fan shall bear a permanently affixed manufacturer's nameplate containing the model number and individual serial number for future identification.
- 4. All fans shall be statically and dynamically balanced.
- 5. Install as required for quiet operations.
- 6. Motor shall be a DC electronic commutation type motor (ECM) specifically designed for fan applications unless otherwise noted.
- 7. Downblast power roof ventilators:
  - a. Downblast power roof ventilators shall have aluminum housing, backwardinclined aluminum fan wheel, gravity-type back-draft dampers, bird screen, aluminum curb cap with pre-punched mounting holes, aluminum rub ring, motor isolated shock mounts, corrosion-resistant fasteners, lifting lugs and factory-wired NEMA 1 toggle disconnect switch. Provide direct drive as indicated. Shaft shall be mounted in ball bearing pillow blocks. Bearings shall have grease fittings.

## 2.4 UNITARY EQUIPMENT (NOT USED)

2.5 TERMINAL EQUIPMENT (NOT USED)

## 2.6 HVAC PIPING AND SPECIALTIES

- A. Piping
  - 1. HVAC drain piping shall be provided as specified below. Where options of different materials are given for the same service, contractor shall select materials and use them uniformly throughout the system. Contractor shall submit experience with all of the materials and joining methods specified.
  - 2. Condensate drain piping
    - a. On rooftop and exterior to building

- 1) Schedule 40 PVC
- 3. Schedule 40 PVC pipe shall be assembled in strict accordance with manufacturer's instructions. Solvent cement shall conform to ASTM D2564.

## 2.7 AIR DISTRIBUTION

## A. Ductwork:

- 1. Provide all ducts, plenums, connections, dampers, and related items required to form a complete system as indicated on drawings and specified herein.
- 2. All ductwork shall be constructed of sheet metal unless otherwise indicated.
- 3. Sheet-metal ducts shall be fabricated from G60 galvanized-steel sheets and shall be of gauges called for and as detailed in 2020 SMACNA Manual, HVAC Duct Construction Standards (Metal and Flexible). All ductwork from variable air volume air handlers to the inlet of VAV terminal boxes shall be 3" w.g. pressure class construction and shall be double-wall round. All constant volume ductwork shall be 2" w.g. pressure class construction and shall be round, flat oval, or rectangular. Rectangular ductwork shall be single-wall construction unless otherwise indicated.
- 4. Duct sealing requirements shall be Class A for all ductwork.
- 5. Round and flat oval duct and fittings shall be manufactured by a company for whom the manufacture of spiral duct and welded fittings has been a principal business for at least 15 years. Contractor fabricated round and flat oval spiral duct and fittings shall not be acceptable.
- 6. All companies being considered as potential suppliers of duct and fitting components shall submit drawings and dimension data for approval. These submittals shall serve as a basis for acceptance or rejection of products.
  - a. All fittings furnished for use on a project shall be identical to the approved submittal data.
  - b. Any fittings rejected by the project engineer shall be replaced with fittings equal to the original approved submittals. All expenses incurred in the replacement of fittings that do not conform to these requirements shall be the responsibility of the installing contractor.
- 7. All medium-pressure supply duct shall be of round spiral lock seam construction where indicated. Steel round duct shall be provided with gauges according to the following 2020 SMACNA HVAC DCS, except no 28-gauge material is allowed:

Diameter	Standard Sp	oiral Gauge	Single-Rib Spiral Gauge
(inches)	0-2" w.g.	2-10" w.g.	0-10" w.g.
3-8	28	26	
9-14	28	26	28

8. Steel flat oval duct shall be of standard spiral with 2C corrugations (corrugations without intermediate ribs) with gauges according to 2020 SMACNA HVAC DCS, the following gauges:

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Major Axis	Standard	Longitudinal
Dimension (inches)	Spiral Gauge	Seam Gauge
24-36	22	20

- 9. Flat oval duct shall be reinforced on its flat span dimension and to the maximum operating pressure by the manufacturer. All reinforcements shall be full circumferential, galvanized coated, mild steel angle rings.
- 10. Duct shall be provided in continuous, un-joined lengths wherever possible. Except when interrupted by fittings, round spiral duct sections shall not be less than 12 feet long. Flat oval duct not interrupted by fittings shall not be less than 12 feet long. Oval spiral pipe and fittings greater than 25" wide, shall have flanged connections. All double-wall rectangular ductwork shall have flanged connections. Flanges for dual wall duct shall also hold the inner liner of dual wall duct concentric without the use of additional couplings or spacers.
- 11. Double-wall round and flat-oval ductwork shall be used where indicated and shall be of spiral lock seam construction with an airtight outer pressure shell, a 2" thick insulation layer, and a solid inner liner that completely covers the insulation throughout. Fittings to have solid inner liner.
- 12. Unless otherwise specified, all double-wall duct and fittings inner shell for dual wall duct shall be a minimum G-60 galvanized sheet metal. All spiral pipe used for inner shells shall have 3 intermediate ribs and be fabricated in accordance with ASTM A525 and A527 specifications in the following minimum gauges:

Nominal Duct Size	Inner/Outer Shell (Gauge)	Inner Shell (Gauge)
3-24	26	26
25-34	24	26

13. Fittings shall be of the following minimum gauges:

Nominal Duct Size	Inner/Outer Shell	Inner Shell
Nominal Duct Size	(Gauge)	(Gauge)
3-34	22	24

- 14. Round fittings may be spot welded and bonded. Oval fittings shall be continuously welded.
- 15. Insulation shall have the following UL rating:

a.	Flame Spread:	10-20
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- c. Smoke Developed: 0-20
- 16. Round and flat oval spiral duct and fittings shall be "UNITED MCGILL CORPORATION," "VORTEX METAL MANUFACTURING," "HAMLIN SHEET METAL," "SEMCO MANUFACTURING, "LINDAB," or "EASTERN SHEET METAL."
- 17. Round and flat-oval ductwork shall not be delivered to the job site until just prior to erection. Ductwork with dents or other damage shall not be accepted.

- 18. Rectangular low velocity ductwork shall be constructed from galvanized steel sheets of lock form quality per ASTM A653 with a G60 zinc coating (0.60 oz/ft<sup>2</sup>), unless otherwise shown on the contract documents. Sheets shall be free of pits, blisters, slivers, and un-galvanized spots.
- Insulated-flexible acoustical air ducts shall be FLEXMASTER USA "1M," 19. THERMAFLEX "M-KE," or equal, suitable for up to 10" w.g. positive pressure and rated velocity of 5500 FPM. Flexible ductwork shall meet NFPA 90A standards, conform to UL standard 181, and be ETL listed Class 1 air duct. Flexible duct shall have a flame spread of less than 25 and smoke developed of less than 50. Flexible ductwork shall be fabricated with a polyethylene or chlorinated polyethylene inner film, wrapped in 2" thick with a thermal conductance of R-6 fiberglass insulation, with an outer reinforced metallized vapor barrier. The inner film shall be supported by a corrosion resistant galvanized steel helix formed and mechanically locked to the polyethylene fabric. The inside bend radius shall be  $\frac{1}{2}$  x inside diameter in all sizes. Flexible branch ductwork to diffusers shall be limited to maximum length of 5 feet long and maximum velocity of 600 feet per minute. Contractor to provide proper flex duct size to ensure velocity limit is not exceeded. Support flexible ducts a minimum of every 4 feet. Supports shall not compress or constrict the flexible duct. Refer to the diffuser installation details on the drawings.
- 20. Provide flexible connections of fiberglass between ducts and air-handling unit connections, fan powered VAV boxes, and exhaust fans. Connector shall be constructed using double lock gripping fingers at metal to fabric contact. Connector shall be rated airtight and watertight up to 10" w.g. positive to 10" w.g. negative pressure. Provide flexible connections, not less than 4 inches wide, constructed of approved fireproof, waterproof, non-asbestos, glass fabric, at the inlet and outlet connection of each fan unit, securely fastened to the unit and to the ductwork by a 24-gauge galvanized steel band provided with tightening screws. There shall be no metal-to-metal contact at flexible connections. There shall be no stretching of the flexible material at flexible connections. Flexible duct connection shall be UL listed, to meet NFPA 90A and 90B requirements and the following applications:
  - a. Indoor: Neoprene coated glass fabric, minimum 30 oz./sq.yd.
  - b. Outdoor: U.V. resistant Hypalon coated glass fabric, minimum 24 oz./sq.yd.
  - c. Flexible connections shall be DUCTMATE "ProFlex," DURODYNE "Flexible Duct Connector," KINETICS "KINFLEX," or equal.
- 21. Space suspended duct hangers every 4 feet, maximum. Insulated duct shall have saddle hangers. Suspended duct hangers attached to the side of the ductwork are acceptable. Refer to duct support details on the drawings.
- 22. Fabricate ductwork with airtight joints, presenting smooth surface on inside, neatly finished on outside. Unless otherwise indicated, provide square or rectangular elbows and provide double wall turning vanes in all elbows. Deflecting vanes shall be double wall blades, fit into side rails, and screw or rivet to duct elbow in field. Blades and side strips shall be small or large double vanes as detailed in SMACNA Duct Manual. Turning vanes shall be DUCTMATE "ProRail," AERODYNE "H-E-P Turning Vanes," DURODYNE "Vane and Rail" or equal.
- 23. Construct, brace, and support ducts in a manner that they will neither sag nor vibrate to any perceptible extent when fans are operating at maximum speed or capacity.

- 24. Provide sandwich type or square framed access doors for service temperature and pressure required, where indicated and where not indicated, in locations and of sizes which shall afford easy access to multi-blade dampers, smoke detectors, fire dampers, and other equipment and devices requiring inspection and servicing. Access doors shall be installed to avoid lights, piping, conduit, ceiling grid, etc., to provide unobstructed access. Access doors shall be installed on the underside of the ductwork. Access doors shall be a minimum of 24" x 18" where possible. Access doors in all factory fabricated ductwork shall be factory installed and sizes and locations shall be identified on the ductwork shop drawing submittal. Duct access doors shall be DUCTMATE "Sandwich Access Door," GREENHECK "CAD-10," ACUDOR "CD-5080," or equal.
- 25. Provide opposed-blade dampers for control of air volume and for balancing system, where indicated or required. Dampers shall be of sheet metal at least one gauge heavier than duct and reinforced; shall be installed in an accessible location. Provide indicating quadrant and locking device for adjusting and locking dampers in position. Provide extended shafts on all volume dampers greater than the thickness of the insulation to provide free movement of damper positioner. Stiffen duct at damper location; install damper in manner to prevent rattling.
- 26. Provide square to round transition fittings with balancing dampers at all round duct take-offs to supply diffusers and registers.
- 27. Duct sizes are inside free area. Increase duct sizes as required.
- 28. Ductwork and accessories shall not be delivered to the job site until just prior to erection and shall be stored in an approved manner.
- 29. All ductwork shall be internally cleaned by vacuuming prior to installation.
- 30. All ductwork open ends shall be sealed with polyethylene and duct tape during construction after hanging.
- B. Grilles, Registers, and Diffusers (Bid Alternate 01 Only):
  - 1. Refer to drawings for types, material, models, finishes, and manufacturers. Air devices shall have performance characteristics (throw, noise, and pressure drop) equal to air devices scheduled on the drawings. Provide performance data with submittal. PRICE, TITUS, GREENHECK, or equal.
  - 2. Grille and register frames and louvers shall be one-piece construction.
  - 3. Paint interior surfaces of ducts behind grilles and registers with flat black enamel.
- C. OWNER-FURNISHED, CONTRACTOR-INSTALLED Series Fan-Powered VAV Terminal Units (Bid Alternate 01 Only)
  - 1. General
    - a. Install series fan-powered air terminal units. The units shall be the size and capacity as outlined in the plans and specifications. Casing dimensions shall be checked to ensure the terminals fit the available space.
    - b. Quality, Agency, Standards. Air terminals shall be certified under the Air Conditioning, Heating and Refrigeration Institute (AHRI) Standard 880-08 Certification Program and carry the AHRI seal. All NC values shall be calculated per AHRI Standard 885-08. Units with NC values calculated per AHRI-885- 90 or 98 will not be accepted. Terminal units shall be UL listed as a complete assembly. Terminal electrical components, including actuators
and low voltage controls shall be UL listed. All electrical components including both line voltage and low voltage shall be mounted in a metal control enclosure. Units shall have a single point field wiring connection. Units shall be manufactured and wired per UL-1995 and in accordance with the National Electric Code.

- c. Shipping. All terminals shall be shipped as a single unit requiring no field assembly. Accessories including electric heaters and fan and motor assemblies shall be factory mounted.
- d. Unit shall be as manufactured by TRANE, model "VSEF" or similar.
- 2. Construction
  - a. The air terminals shall be constructed of galvanized steel. The casing shall be a minimum of 22-gauge. The terminal primary air inlet valve shall have a round inlet for field duct connection. The terminal unit discharge shall allow for a rectangular flanged duct connection. Units shall have a universal control-mounting panel constructed of minimum 22-gauge steel. Control panel shall include stand-offs to allow controls to be mounted without penetrating the terminal casing. Control panels without stand-offs are not acceptable. Fan mounting deck shall be a minimum of 18-gauge.
    - 1) Filter Rack. Unit shall include filter rack in the induced air inlet and shipped from the manufacturer with a 2" construction filter.
- 3. Primary Air Inlet Valve
  - a. Primary inlet air valve assembly shall have a seamless butt weld on round inlet tube to minimize leakage and prevent the damper from binding on overlapping seam welds. Inlet tubes with overlapping welds or non-continuous, skipped welds are not acceptable. Inlet air valve shall have three structural beads machine formed into the tube. One external bead shall be provided for the attachment of flexible duct. Inlet air valves without three structural beads are not acceptable.
  - b. Primary inlet air valve flow sensor shall be multi-quadrant averaging sensor with flow sampling of both velocity pressure and flow differential pressure from four quadrants and shall contain two control ports and two accessory ports. Flow sensors sampling only velocity pressure in all four quadrants are not acceptable. Sensors reading differential pressure with fewer than 8 measuring points are not acceptable. All piping connections to the flow sensor must be made with external ports that extend through damper tube. Units with piping connections made in the primary air stream are not acceptable. Flow sensors with plastic piping connections of any kind are not acceptable. At an inlet velocity of 2000 fpm, the differential static pressure required to operate any terminal size shall not exceed 0.14" wg. for the basic terminal
    - 1) Air terminals with inlet flow sensing devices shall be provided with a gasketed access door to permit removal, inspection, and cleaning of the air flow sensor.

- c. Damper Assembly. Damper shaft shall rotate in a self-lubricating, long life, low friction thermo- plastic bearing. Damper shaft construction shall be onepiece, continuous extruded aluminum. Damper shaft end shall include a permanent cast damper position indicator. Damper tube shall be free of obstructions including damper stops to allow the free rotation of the damper. Mechanical damper stops located in the inlet tube are not acceptable. A flexible gasket-mounted damper blade without adhesives shall provide damper seal. Damper gasket shall include slit partitioning around the perimeter to prevent damper noise at low flows near full close off. Damper gaskets without perimeter slit partitioning are not acceptable. Mechanically fastened damper assembly shall be double layer, 18-gauge equivalent, galvanized steel with integral blade seal. Leakage through the damper assembly shall be less than 1% of maximum CFM at 3" static pressure.
- 4. Insulation
  - a. Air Terminals shall be internally insulated with 1" thick, 1.5 lb./cf dual density fiberglass covered with scrim backed foil facing. All surfaces and edges of the insulation shall be sealed with scrim backed foil facing so that there is no exposed fiberglass in the airstream. Insulation shall comply with UL 181 and NFPA 90A.
- 5. Fan Assembly, ECM Motors, and Controls
  - a. Unit construction shall include isolation between the motor and fan housing.
    b. Fan shall be a forward curve, dynamically balanced with a direct drive motor. Motors shall be single phase, 60 cycle, 120, 208, or 277 volts. The motor shall be single speed manufactured specifically to meet the torque requirements for each size terminal.
    - 1) Units shall include a motor controller which shall allow remote adjustment of the motor. Controller shall accept either a 2-10 Vdc signal or 4-20 mA signal to control RPM. Control shall also allow the option for a 1 Vdc signal to turn off the fan.
- 6. Electric Heat
  - a. Electric reheat coils shall be factory mounted on the discharge of the Air Terminal with the sizes, kilowatts, steps, operating voltage, control voltage, and accessories as outlined in the plans and specifications. Heater casings shall be constructed of galvanized steel. Element wire shall be high grade nichrome alloy rated to 45 watts per square inch density. Element wire shall be supported by moisture resistant steatite ceramics. Ceramics to be enclosed in reinforcement brackets spaced across the heater element rack at 2" to 4" intervals. Controls shall be contained in NEMA 1 control cabinet with a hinged, latching door. A permanent wiring diagram shall be affixed to the inside of the control cabinet door for field reference.
  - b. The heating element rack shall be recessed 1" into the duct to assure adequate air temperature readings for proper operation of safety switches. Each heater shall be shipped with an ETL label certifying that it meets or

exceeds the safety requirements of Standard 1996. Each heater will have an automatic primary high temperature limit switch, a manual reset high temperature limit switch, air static or fan relay type air proving switch and fusing if the heater exceeds 48 amps as required by UL. A terminal block for line and control voltage shall be provided for simplified field wiring. A P.E. switch or contactor shall be provided for each stage of heat.

- c. The heaters shall be ETL listed for zero clearance, tested in accordance with UL Standard 1995, CSA-C22.2 No. 236 and in accordance with the National Electric Code (NEC).
- 7. Access Panels and Mounting
  - a. Unit shall have a bottom motor/blower access panel. A separate bottom primary inlet access panel shall be provided for maintenance of the air flow sensor.
  - b. Unit shall be configured with field-mounted hanger brackets designed to accept threaded rods up to 5/16" in. diameter.
- 8. Sound
  - a. The terminal manufacturer shall provide ARI certified sound power data for radiated and discharge sound. All NC values shall be calculated per AHRI standard 885-98. Verify sound ratings for the terminal do not exceed specified value at scheduled static pressure. Sound performance shall be AHRI certified. Each individual terminal unit shall bear an AHRI label.
- 9. Controls
  - a. Factory mounting and wiring of DDC controls shall be as specified in the schedule. Mounting shall include manufacturer's flow sensor, transformer (if required by DDC controls manufacturer), and an enclosure protecting DDC controls and wiring.

## 2.8 VIBRATION ISOLATION

- A. Mechanical equipment indicated below shall be isolated from the structure by resilient vibration and noise isolations. Equipment to be isolated includes, but is not limited to, the following:
  - 1. Rooftop Air Handling Unit (RTU-9, Bid Alternate 01 Only)
- B. Vibration Isolation Rail System:
  - 1. Curb mounted rooftop equipment shall be mounted on vibration isolation rails that fit over the roof curb and under the isolated equipment. Curb mounted isolation rails shall be MASON "CMAB," VIBRO-ACOUSTICS "ARTR," MGM "ISORAIL," or equal. RTU-9 shall be mounted on an adapter curb with vibration isolation rails.
  - 2. The extruded aluminum top member shall overlap the bottom to provide water runoff independent of the seal.

- 3. Aluminum members shall house powder coated springs selected for 0.75" minimum deflection. Travel to solid shall be 1.5" minimum. Spring diameters shall be no less than 0.8 of the spring height at rated load. Wind resistance shall be provided by means of resilient snubbers in the corners with a minimum clearance of 1/4" so as not to interfere with the spring action except in high winds. Manufacturer's self-adhering closed cell sponge gasketing shall be used both above and below the base and a flexible EPDM duct like connection shall seal the outside perimeter. Foam or other sliding or shear seals are unacceptable in lieu of the EPDM duct-like closure.
- C. Hanger and Guide Supports:
  - 1. Spring Isolators:
    - a. Series fan powered variable air volume terminal units shall be suspended with vibration spring isolators. Isolators shall be MASON "30N," VIBRO-ACOUSTICS "SHRB," KINETICS "SRH," or equal.
    - b. Hangers shall consist of rigid steel frames containing minimum 1-1/4" thick neoprene elements at the top and a steel spring seated in a steel washer reinforced neoprene cup on the bottom. The ratio of the spring diameter divided by the compressed spring height shall be no less than 0.8. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. The neoprene element and the cup shall have neoprene bushings projecting through the steel box. To maintain stability, the boxes shall not be articulated as clevis hangers, nor the neoprene element stacked on top of the spring. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to swing through a 30° arc from side to side before contacting the cup bushing and short circuiting the spring.
- D. Rooftop Acoustical Systems: Provide acoustical material inside the roof curb as indicated on the Contract Drawings. Acoustical material shall be furnished by the isolation curb manufacturer, and consist of the following:
  - 1. Vibration Isolation Rail System: Provide 2 layers of moisture resistant 5/8" gypsum board on top of 3/8" x 1-3/4" foam pads. Foam pads shall be mounted on 2" aluminum channel that extends the width of the curb rail. The aluminum channel shall be installed above the spring isolator to attenuate acoustical vibrations translated through the roof curb.
  - 2. Provide 2" thickness ROCKWOOL "AFB," OWENS-CORNING "705," or JOHNS MANVILLE "Insul-SHIELD" acoustic batt insulation with 2.8 lbs./sf density on top of the gypsum board.

## 2.9 MEASUREMENT AND CONTROL

- A. Low Voltage Condensate Overflow Shut-off Switch
  - 1. Low voltage condensate overflow shut-off switches shall be installed on all condensate drain pans as manufactured by RECTORSEAL "AquaGuard," LITTLE GIANT "ACS-2," ASURITY "CC-1," or equal.

- 2. Mechanical equipment without adequate pan clearance to install a primary drain pan switch shall provide a switch installed on the primary drain pan outlet. The condensate shut-off switch shall detect downstream clogs in condensate drains and interrupts the thermostat circuit to shut off the unit before flooding occurs. Switch shall be RECTORSEAL "Safe-T-Switch," LITTLE GIANT "ACS-5," ASURITY "CS-1," or equal.
- 3. The condensate shut-off switch shall detect rising water in condensate drain pans and interrupts the thermostat circuit to shut off the unit before flooding occurs. The device shall be installed on the primary drain pan rim with a two-piece clamp system that does not require drilling.
- 4. The switch shall incorporate a high capacity 5-amp, 24-volt AC magnetic float switch in a fully housed protective cover. The housing shall include a pull up test knob for functional testing of system.
- 5. The switch shall include an alarm wire to connect to the BAS. The switch shall send an alarm signal to the BAS front-end workstation. The mechanical contractor shall be responsible for coordinating the switch connections with the controls contractor.
- 6. The switch shall be UL Listed to comply with UL 508.

# PART 3 - EXECUTION

- 3.1 TESTS
  - A. Refer to Section 230593 "Testing, Adjusting and Balancing" for related requirements.
  - B. At their discretion, the Owner shall be represented at all tests. Contractor shall provide 48 hours' notice to the Owner prior to the tests unless otherwise specified.

# 3.2 EQUIPMENT COORDINATION

- A. The Prime contractor shall conduct an HVAC Coordination meeting after submission of the HVAC equipment, fire alarm, and controls submittals to the Engineer, and prior to the return of the reviewed controls submittal to the Prime Contractor. The Prime Contractor shall coordinate the meeting time, date, and location with all parties, provide a written agenda, provide written meeting minutes, and provide a detailed issues summary (if unresolved issues remain open after the meeting).
- B. The Prime Contractor shall provide follow-up action as required with the following in mandatory attendance:
  - 1. Prime Contractor Project Manager and Project Superintendent
  - 2. Equipment manufacturer technical services representative (not a sales representative)
  - 3. Controls contractor technical services representative (not a sales representative)
  - 4. Mechanical engineer
  - 5. Owner's representative
  - 6. Fire alarm system representative

C. The purpose of this meeting is to review equipment, control sequences, and the selected manufacturer's available control points. Upon completion of this meeting, the General Contractor shall be required to submit a meeting report detailing all discussed issues and coordinated solutions. Any unresolved issues shall require another mandatory meeting to ensure all items have been considered and coordinated prior to construction.

END OF SECTION 230500

SECTION 230593 - TESTING, ADJUSTING AND BALANCING (TAB)

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections and Section 230100 "Mechanical General Provisions" apply to this Section.

#### 1.2 SCOPE OF WORK

- A. The General Contractor shall obtain the services of an independent testing and balancing agency whose business is limited to testing, adjusting and balancing and shall be certified by AABC (or NEBB). Agency shall have been in the TAB business for a minimum of 5 years. The TAB (Testing, Adjusting and Balancing) Agency shall be a direct subcontractor of the General Contractor and not affiliated in any way with the Mechanical Contractor.
- B. Testing and balancing shall be performed in accordance with National Standards for Testing and Balancing Heating, Ventilating and Air-conditioning Systems, 2002, as published by Associated Air Balance Council (AABC).
- C. All work shall be performed under the direct supervision of a certified TAB Engineer. All other personnel shall be regular full-time employees of the TAB Agency.
- D. Test and Balance Agency shall submit within 30 days after receipt of construction contract two copies of qualifications, including current TAB Engineer's certificate and National Project Certification Performance Guaranty.
- E. TAB work shall not commence until all components of the HVAC system have been installed completely, including all power wiring and controls and all equipment has been started and run tested in each mode of operation. Should any items be found incomplete at the time that TAB work is performed, the TAB Agency shall immediately notify the General Contractor and Owner's Representative of any deficiencies found. The General Contractor shall be responsible for correcting reported deficiencies and verifying that the system is 100% complete, operable and ready for TAB work to proceed.

## PART 2 - PRODUCTS

## 2.1 MATERIAL AND EQUIPMENT

A. Provide all necessary instrumentation required to measure and adjust the HVAC air systems.

- B. Equipment and instruments shall be of types approved by the Owner's Representative and/or manufacturers of devices installed.
- C. Instruments used for testing and balancing of air and hydronic systems shall have calibration verified within a period of 12 months prior to balancing.

## PART 3 - EXECUTION

## 3.1 GENERAL, MECHANICAL AND ELECTRICAL CONTRACTOR'S RESPONSIBILITY

A. The General Contractor shall be responsible for directing the Mechanical and Electrical Contractors to fulfill the Contractors' Responsibility for Testing, Adjusting and Balancing as required in Section 230100. TAB work shall not commence until the conditions of paragraph 1.2.E of this Section and all requirements of Section 230100 for TAB have been completed.

## 3.2 TAB AGENCY'S RESPONSIBILITY

- A. Carefully review the drawings and Specifications for the various systems noting all facilities incorporated in the design for purposes of adjusting and balancing. Should it be deemed necessary to provide additional dampers, baffles, valves, or other devices which would aid in the required adjusting and balancing, same shall be provided by the installing contractor.
- B. The TAB Agency shall report any and all deficiencies that prohibit adjusting and balancing in accordance with the Contract Documents to the Contractor and the Owner's Representative.
- C. Adjust all duct and equipment, including valves, controls, dampers, cocks, etc., to properly perform to  $\pm 10\%$  of their respective design quantities of flow.
- D. Determination of the air volumes shall be made by pitot tube and differential draft gauge for all supply, return, outdoor air and exhaust air ducts. Openings for pitot traverses shall be provided as required and shall be fitted with neat removable plugs or covers. Air quantities at grilles, registers, diffusers, etc., shall be measured as recommended by the various manufacturers of the outlets.
  - 1. Fan powered VAV boxes shall be balanced in a manner that assures the design primary airflow is delivered to the VAV box at maximum and minimum air flow. The manufacturer provided flow measurement device may or may not be accurate due to upstream duct conditions. (see 3.2.H.7 for reporting requirements)
- E. The Test and Balance Agency shall perform the following:
  - 1. Adjust fan RPM, tighten and align fan belts, measure operating amps.
  - 2. Adjust volume dampers to obtain designed air volume.
  - 3. Adjust grilles, diffusers and registers to obtain designed airflow and air pattern.
  - 4. Adjust each air handler to obtain designed airflow.
  - 5. Adjust dampers to provide design outside air quantities.

- 6. In cooperation with the ATC Contractor's representative, setting adjustments of automatically controlled dampers to operate as specified. The TAB Agency shall inform ATC Contractor of all abnormalities in sequencing and/or calibration of components discovered during balancing.
- 7. Final settings of dampers and valves shall be permanently marked. Where provided, memory stops and locking devices shall be adjusted and locked to the final setting.
- 8. Assist Fire Alarm Contractor in the testing of all duct smoke detectors. Measure the air velocity across each duct smoke detector with air handling unit at full airflow.
- F. Before the work is offered for Final Acceptance, all equipment shall be run through a test to demonstrate that it has been adjusted to meet the requirements of the drawings and Specifications. Copies of the test and adjustment data shall be submitted in a report to the Owner's Representative prior to final inspection.
- G. The TAB Report shall include a General Comments section providing an overview of systems operation, observations of system installation abnormalities and deficiencies, problems encountered, etc. If required, provide explanation of methods of measurement and disparity between measured and design quantities.
- H. Test and Balance Agency Report shall include the following data for each system. All sheets shall be neatly typed. Balancing Agency shall submit with his report a set of neatly marked plans identifying location of each piece of equipment, air terminal, flow measuring device and points of traverse. Report all measured quantities and design quantities where applicable.
  - 1. CFM of each supply, return, exhaust grille and diffuser.
  - 2. RPM and CFM of each fan.
  - 3. Supply, return and outdoor air CFM of each AHU and fan terminal unit where required.
  - 4. Air pressure drop across A/C unit cooling coils.
  - 5. Air pressure drop across each filter bank.
  - 6. Discharge and suction static pressure of each fan.
  - 7. Maximum and minimum differential pressure and corresponding CFM of each terminal box.
  - 8. Voltage rating and operating volts of each fan motor. For fan motors requiring threephase power, record voltage of each individual phased leg and check for voltage imbalance.
  - 9. Temperatures for each air handling unit at maximum capacity including the following measurements:
    - a. Entering and Leaving air temperature at each coil.
  - 10. Air Handling unit is defined as any equipment that consists of a fan and coil, including Rooftop Air Handling Unit RTU-9 (Bid Alt 01)
  - 11. Nameplate data of each piece of HVAC equipment installed.
  - 12. Velocity across each duct smoke detector at full airflow.
- I. During the Final Inspection, the Agency shall have present all necessary instrumentation and an individual to make readings of select information which was submitted in the balance report. The select readings shall be made where directed by and in the presence of the Owner's Representative and shall not deviate more than 5% from the values submitted in the report.

J. The Owner's Representative may select no more than 20% of all reported data for rechecking. If more than 20% of data verified is not within  $\pm 5\%$  of submitted data, the Owner's Representative may void entire report and ask for complete rebalancing. The field check shall be made within 45 days of approved TAB submittal.

END OF SECTION 230593

## SECTION 230700 - MECHANICAL INSULATION

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections and Section 230100 "Mechanical General Provisions" apply to this Section.

#### 1.2 SUBMITTALS

A. Submit manufacturers' data on all insulation products, schedule which indicates where each product is to be used and thickness of each product.

#### 1.3 WARRANTY-GUARANTEE

A. Contractor shall furnish written warranty, countersigned and guaranteed by the General Contractor, stating that work executed under this Section of the Specifications shall be free from defects of materials and workmanship for a period of 12 months from date of Substantial Completion.

## PART 2 - PRODUCTS

#### 2.1 INSULATION – GENERAL

A. All insulation shall have a composite (insulation, jacket or facing and adhesive used to adhere the facing or jacket to the insulation) fire and smoke rating as requested by ASTM E84, NFPA 255 and UL 723, not exceeding:

Flame spread	25
Smoke developed	50

- B. Accessories, such as adhesive, mastics, cements, tapes and fire-resistant cloth for fittings, shall have same fire and smoke ratings as components listed above.
- C. Installation of insulation shall be accomplished in strict accordance with manufacturer's recommendations and shall be CERTAINTEED, OWENS-CORNING, JOHNS MANVILLE or KNAUF INSULATION for glass fiber insulation; ARMACELL, AEROFLEX, or AEROFOAM for flexible unicellular insulation.

## 2.2 PIPE INSULATION

- A. Glass fiber insulation having a thermal conductivity not greater than 0.24 Btu x in./hr. x sq. ft. x °F in a mean temperature of 75°F. Insulation shall have factory-applied all-purpose jacket.
- B. Flexible unicellular insulation having a thermal conductivity not greater than 0.27 Btu x in./hr. x sq. ft. x °F in a mean temperature of 75°F.

#### 2.3 DUCT INSULATION

- A. Blanket Type within the conditioned space: Glass fiber, 3/4-lbs/cu. ft., foil faced, vaporsealed flexible duct insulation. Thermal conductivity shall not exceed 0.29 Btu x in./hr. x sq. ft. x °F.
- B. For the purposes of this Section, unconditioned space shall be defined as any area not directly served by supply ductwork. Plenum spaces shall be considered conditioned. Attics, mezzanines, and mechanical rooms shall all be considered unconditioned.

#### 2.4 ACOUSTIC DUCT LINER

A. Fiberglass duct liner shall not be used.

#### 2.5 PVC PIPE JACKET FITTING COVERS

- A. One-piece molded-type PVC plastic fitting covers and jacketing material, color matching JOHNS MANVILLE Zeston 2000, or approved equal.
- B. Connections shall be made using pressure-sensitive color matching vinyl tape.

## PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Insulation shall be installed by a licensed applicator and in strict accordance with the manufacturer's instructions. Deliver all materials to the job site and store in a safe, dry place. Use all means necessary at the job site to protect materials from dust, dirt, moisture and physical abuse before and during installation. Insulation that becomes damaged prior to installation shall not be installed and shall be removed from the job site. Insulation that becomes wet or damaged after installation shall be removed and disposed of and replaced with new insulation.
- B. Surfaces to be insulated shall be cleaned free of dirt, scale, moisture, oil and grease prior to installation of the insulation.

#### 3.2 PIPING (GLASS FIBER INSULATION, UNLESS OTHERWISE NOTED)

A. Schedule:

Domestic Cold Water	1/2" thickness for pipe sizes up to $1-1/4$ "
Domestic Hot Water	1" thickness for pipe sizes up to 1-1/2"

- B. Fittings and valves on insulated piping smaller than 4" shall be insulated with fiberglass blanket to thickness equal to adjoining pipe insulation unless otherwise noted.
- C. All valves and piping accessories above ceilings handling cold water shall be completely insulated to prevent condensation.
- D. No piping shall be insulated until it has been tested and thoroughly cleaned.
- E. Hangers and supports for cold water piping shall not injure or pierce insulation.

## 3.3 DUCTWORK

- A. Definitions:
  - 1. Concealed: Ductwork which shall be hidden from view by ceilings, walls, chases, or soffits, either by the work of this Contract, or by future tenant build-out work.
  - 2. Exposed: Ductwork which is permanently in view, typically found in mechanical, storage, electrical, or other unfinished space.
  - 3. Unconditioned Space: Any area not directly served by supply ductwork. Plenum spaces shall be considered conditioned. Attics, mezzanines, and mechanical rooms shall all be considered unconditioned
- B. Schedule:

Concealed Supply and Return Ductwork Externally Insulated: (inside the conditioned space)	2" thickness blanket
Exposed Supply and Return Ductwork Externally Insulated: (inside the conditioned space)	1-1/2" thickness rigid board
Transfer Ducts:	Not Required
Exhaust Ducts:	Not Required

- C. Insulate necks and tops of all supply air diffusers, registers and grilles.
- D. Finish all edges of insulation with mastic sealant to ensure no insulation is exposed, where installed outdoors or in unconditioned spaces.

- E. Where installed in conditioned spaces, blanket-type insulation shall be stapled and taped in accordance with manufacturer's instructions. Tape all edges of insulation to ensure that no insulation is exposed.
- F. Insulation on ductwork over 16" in height or width must be attached with stick pins. When using self-adhesive pins, prepare surface to be applied to ensure adhesion.

END OF SECTION 230700

## SECTION 230800 - COMMISSIONING

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 230100, "Mechanical General Provisions," and Section 265100, "Interior LED Building Lighting" apply to this Section.

#### 1.2 WORK INCLUDED

- A. A separate Commissioning Agent (the Architect/Engineer) will be engaged by the Owner to administer the commissioning. (Bid Alt 01 only)
- B. The Contractor shall provide all commissioning services as outlined in this Section; perform all testing, measurements, and inspection outlined in the 'Commissioning Plan'; and coordinate with the Commissioning Agent. A template Commissioning Plan is attached. The final plan will be written after the construction contract is underway.
- C. The Systems to be commissioned include:
  - 1. All HVAC and related systems
  - 2. All lighting

#### 1.3 COMMISSIONING OBJECTIVES

- A. To ensure that all building systems, subsystems, equipment, controls, and interfaces with other building systems are installed, tested, and are operating in compliance with Contract Documents and within the scope of design requirements.
- B. To ensure that all system operation and maintenance personnel are properly instructed to effectively and efficiently operate and maintain the systems, subsystems, equipment, and controls, and that they will receive all required manuals and documentation.
- C. The Commissioning Agent shall provide the following to the Contractor for implementation and execution.
  - 1. Commissioning Plan: The Commissioning Agent shall prepare the Commissioning Plan in accordance with contents as specified herein.
  - 2. Checklists and Test Forms: The Commissioning Agent shall prepare the Pre-Functional Checklists and Functional Performance Test Forms, specifically for this project, and edited to suit the equipment and systems installed.

- 3. Submittals:
  - a. The Contractor shall submit the following documents to the Commissioning Agent for review and inclusion in the Commissioning Plan.
    - i. Piping pressure and vacuum test reports
    - ii. Equipment startup reports
    - iii. DALT report
    - iv. TABs report
    - v. Prefunctional Checklists completed by the installing Foreman.
    - vi. Functional Checklists completed by the Mechanical Contractor.
    - vii. O&M Manuals with warranties
    - viii. Training class agenda and schedule
  - b. Commissioning Report: The Commissioning Agent shall assemble the final Commissioning Report comprised of completed prefunctional and functional checklists, equipment startup test reports, etc. organized by subsystem and submitted as one package. The results of failed tests shall be included along with a description of the corrective action taken.

#### 1.4 REFERENCED STANDARDS

- A. ASHRAE 90.1-2016, 6.7.2.4
- B. NEBB, "Procedural Standards for Building Systems Commissioning."
- C. SMACNA, "HVAC Systems Commissioning Manual."

## 1.5 COMMISSIONING TEAM

- A. The Contractor shall designate team members from each of the following to participate in the Commissioning Process (both pre- and post-occupancy):
  - 1. General Contractor
  - 2. Mechanical Subcontractor (and HVAC startup technicians)
  - 3. Electrical Subcontractor
  - 4. Testing, Adjusting and Balancing (TAB) Subcontractor
  - 5. Automatic Temperature Controls Subcontractor
- B. The Owner shall designate a representative to participate in the Commissioning Process.
- C. Each of the team member's names shall be submitted in writing to the Commissioning Agent for inclusion in the Commissioning Plan.

## PART 2 - PRODUCTS (NOT APPLICABLE)

## COMMISSIONING

## PART 3 - EXECUTION

#### 3.1 IMPLEMENTATION OF COMMISSIONING PLAN

- A. Plan Submittal: After the start of construction, the Commissioning Agent shall provide the Commissioning Plan to the Contractor for implementation and execution. The Plan shall provide the scope of commissioning tasks to the appropriate parties. Typical elements of the Plan shall include the following:
  - 1. Commissioning Agent's preparation of the Commissioning Test Schedule and distribution to the Contractor and Owner.
  - 2. Commissioning Agent visits to the job site to observe installation activities.
  - 3. Contractor's pre-startup verification and completion of the Pre-functional Checklists.
  - 4. Contractor's submittal of equipment and systems startup verification to the Commissioning Agent.
  - 5. Contractor's submittal of testing, adjusting, and balancing (TAB) reports to the Commissioning Agent.
  - 6. Contractor's independent functional performance testing after receiving functional performance checklists from the Commissioning Agent.
  - 7. Contractor's functional performance testing with the Commissioning Agent.
  - 8. Contractor's completion of operating and maintenance manuals and submittal to the Commissioning Agent.
  - 9. Contractor's operation and maintenance personnel instruction.
  - 10. Commissioning Agent's preparation of the Final Commissioning Report and submission to Owner.
  - 11. Owner acceptance
- B. Equipment and Systems Startup:
  - 1. Pre-startup Verification: Prior to startup of equipment and systems, the Contractor shall indicate on the pre-start checklists and Commissioning Agent shall observe and verify that all items have been substantially installed in accordance with the project Contract Documents, including all change orders. Verification of the basic installation testing of systems shall be performed by the Contractor and shall include:
    - a. Cleaning of equipment and systems of construction dirt and debris, including replacement of filters, and all items per the approved checklists
    - b. Lighting shop drawings, floor plans, and sequence of operations have been approved.
  - 2. Startup Verification: The Contractor shall indicate on the startup checklists, and Commissioning Agent shall verify that all HVAC equipment, systems, and subsystems have been activated and operate substantially in accordance with Contract Documents, with all equipment, system, and electrical operating and safety devices checked and functional. The Contractor's work also includes but is not limited to:

- a. Calibration and testing of all automatic temperature control devices and building automation systems.
- b. Testing and verification of all interlocks and interfacing between HVAC equipment, systems, subsystems, and other building systems.
- c. Completion of testing, adjusting, and balancing (TAB) work, including the rechecking of 10% of the measurements.
- d. Startup testing of the lighting systems.
- e. Lighting occupancy sensors and automatic daylight controls.
- 3. Startup Documentation: Completed startup checklists shall be filled out by the Contractor after startup verification of each HVAC system, subsystem or each item of HVAC equipment. Startup checklists used by the Contractor Technicians shall be neat and typed using standard formats appropriate for the equipment. At the request of the Owner, Contractor shall provide trend data demonstrating equipment has been started and is operating within design parameters.
- 4. Contractor's Independent Functional Performance Testing: Prior to the functional performance testing with the Commissioning Agent onsite, the Commissioning Agent shall send all Functional Performance Checklists to the Contractor. The Contractor shall be responsible for performing all tests and verifications included in the Functional Performance Checklists. Upon completion of checklists for each piece of equipment, Contractor shall sign and return checklists to the Commissioning Agent.
- 5. Notification: The Commissioning Agent shall notify the Owner and Contractor when the startup verification has been completed, Contractor's independent functional performance testing has been completed, and the HVAC functional performance testing with the Commissioning Agent can be started.

## 3.2 FUNCTIONAL PERFORMANCE TESTING

- A. Purpose: Every item of equipment, all systems and subsystems, controls, and all related equipment shall be tested and evaluated for conformance to performance data in the Contract Documents. Included is conformance to:
  - 1. Equipment input and output capacities.
  - 2. Systems and subsystems flow and distribution performance.
  - 3. Control system performance, accuracy, and adherence to sequences of operation.
  - 4. Minimum or part load operations and performance.
  - 5. Interface with other equipment and/or systems.
- B. Equipment Testing: Equipment functional performance testing shall not begin until the following notification of completion has been given to the Owner by the Commissioning Agent.
  - 1. Copies of the manufacturer's equipment start up reports are submitted to the Engineer for review and approval.
  - 2. Copies of the commissioning pre-start up and start up reports are submitted to the Engineer and Owner for review and approval.

- 3. Testing and balancing report is submitted to and approved by the Engineer.
- 4. Direct digital control graphic screen shots of all equipment are submitted for approval by Engineer and Commissioning Agent, showing each unit operating within design parameters and Owner-designated operating schedules. Screen shots must be visible to Owner on Owner's front-end workstation when submitted.
- 5. Demonstrate through trend data successful operation of the HVAC systems for a period of not less than 2 weeks. Any alarms during this 14-day period will restart the 14-day run time, unless otherwise advised by Engineer or Commissioning Agent.
- 6. Functional performance test checklists developed by the Commissioning Agent shall be used by the Contractor to document the equipment functional performance tests. Each item of equipment will be functional performance tested by the Contractor and the results documented by the Contractor at full load (and under part load conditions where required by the Contract Documents). Operation under "abnormal and/or emergency conditions" shall be simulated by the Contractor for equipment and systems, and all safety equipment and control operations verified. Test methods shall be documented and approved by the Commissioning Agent prior to implementation and shall be covered during the Owner's training as well. No equipment test functions or procedures shall be eliminated from the functional performance test unless approved by the Commissioning Agent and the Owner.
- C. Systems Testing: Functional performance testing shall not begin until all equipment and systems have had startup verification by the Contractor and notification of completion has been given to the Owner by the Commissioning Agent.
  - 1. Functional performance test checklists to document system or subsystem functional performance tests.
  - 2. The functional performance testing of systems by the Contractor shall begin after equipment and subsystems have been tested and documented 14-day alarm free operation. The system interlock and interface testing sequence shall depend on the system design, complexity, and other factors.
  - 3. HVAC systems and subsystems shall be tested under full load conditions and under part load conditions by the Contractor.
  - 4. Actual physical responses shall be observed. Reliance on control signals or other indicators is not acceptable.
  - 5. Control component input and output signals shall be confirmed by the Contractor for correctness under all operating conditions.
  - 6. At the end of the functional performance test procedures, every mode of each operation of a system, each piece of equipment, every item in the control sequence description, and every zone or subsystem shall be proven to operate by the Contractor as defined in the project Contract Documents.
- D. Test Documentation: Functional performance test checklists developed by the Commissioning Agent shall be used by the Contractor to document the results of the functional performance testing process.
  - 1. Testing verification shall be provided by signatures of responsible parties (the Contractor, Sub-Contractors, Commissioning Agent, and Owner's Representative) on the functional performance test checklists and equipment checklists.

- 2. Functional performance testing shall be performed by the Contractor, by members of the Commissioning Team as outlined, and approved by the Commissioning Plan.
- 3. All members shall remain on the Commissioning Team throughout the entire functional performance testing procedures. Substitutions shall be permitted only by written approval of the Commissioning Agent and Owner.
- E. Test Failures: No system or subsystem shall be accepted until all items of equipment in the system have approved and verified functional performance test checklists.
  - 1. When a functional performance test is not approved, the Contractor shall be directed to provide a written report to the Commissioning Agent listing the deficiencies causing the test failure, and the possible remedies to correct the deficiencies.
  - 2. After all deficiencies have been corrected; the entire functional performance test for the equipment, system, or subsystem shall be repeated.
  - 3. The Commissioning Agent will continue to monitor the actions to correct the equipment or system deficiencies until an acceptable functional performance test has been accomplished.
- F. Deferred Tests: If any checklist or functional performance test cannot be completed for seasonal reasons, lack of occupancy, or for other reasons, a written report shall be sent by the Contractor to the Commissioning Agent indicating when the test will be scheduled.
  - 1. If any checklist or functional performance test cannot be accomplished due to deficiencies outside the scope of the work, the deficiencies shall be resolved and corrected by the appropriate parties before completion of the commissioning process.
- G. Control System Verification: The Control Contractor shall provide a field technician on site with a portable control access computer and related test equipment. The date and time of this control system verification testing shall be scheduled in advance with the Commissioning Agent. The field technician shall demonstrate to the Commissioning Agent the accuracy of each physical input point, and the response of each physical output point during each mode of operation identified in the Sequence of Controls.
- H. A checklist shall be provided by the Contractor for each of the physical hardware points prior to this system verification demonstration, with all identification information and the physical location of each physical input/output device. For input sensors, this checklist shall be completed during the field test to indicate what the actual measured reading was during the verification, verses what the control system indicated it was. For output devices, this checklist shall indicate what the response actually was verses what it should have been for each mode of operation. Any defective control component shall be replaced, and any programming errors identified shall be corrected and re-demonstrated to the Commissioning Agent.
- I. Every item of the systems listed in 1.2.B shall be functionally tested in the presence of the Commissioning Agent and Owners Representative by installing contractor and supplying vendor technical representative.
- J. Upon completion of the Function Performance testing process as listed in the above items, Contractor shall submit electronic copies of project Operation & Maintenance manuals to Engineer and Commissioning Agent for review and approval.

K. The lighting occupant sensors, lighting schedules, etc. shall be verified during functional testing in accordance with the International Energy Code.

## 3.3 OPERATOR INSTRUCTION

- A. During System Installation: Schedules and materials for the participation of the operation and maintenance personnel during the installation of the systems and equipment shall be implemented as per the Commissioning Plan or as indicated in the Contract Documents by the Contractor.
  - 1. Operation and maintenance personnel instruction shall include:
    - a. An instruction agenda with objectives
    - b. Classroom sessions using Contract Documents (specifications, system drawings), shop drawings, sequence of operations, equipment installation and operation manuals, and audio-visual aids, etc.
    - c. "Factory specialist" presentations by representatives approved by the Commissioning Agent
    - d. Job site visits
    - e. Sign-in sheets to verify attendance
    - f. Video-taping of all sessions
- B. During Commissioning: The Contractor shall prepare schedules and coordinate the training sessions with the parties involved.
  - 1. Equipment and systems maintenance manuals and schedules should be provided along with other information not provided during the installation phase instruction sessions.
- C. Turn-over Instruction: When the systems are ready to be turned over to the Owner, the Contractor shall schedule a final session for operation and maintenance personnel instruction. The following shall be included:
  - 1. Attendance by the Commissioning Agent, installing contractors, major equipment suppliers, and all other interested parties
  - 2. Review of all system and equipment operations
  - 3. Additional hands-on instruction where requested by the Owner or Commissioning Agent
  - 4. A question/answer discussion period

#### 3.4 COMMISSIONING REPORT

- A. The commissioning documentation shall be prepared by the Commissioning Agent and shall be organized into a format similar to the Commissioning Plan. All pages shall be numbered, a table of contents provided, and shall include the following information:
  - 1. Commissioning Plan: Provide a copy of the Commissioning Plan.

- 2. TAB Reports: Contractor shall provide approved testing, adjusting, and balancing (TAB) reports for all HVAC systems being commissioned to the Commissioning Agent for inclusion in the Report.
- 3. Drawings: As-built shop drawings of equipment and systems, sequence of operations, and as-built Contract Documents as modified by change orders shall be provided by the Contractor to the Commissioning Agent for inclusion in the Report.
- 4. Startup Checklists: Provide all startup checklists and equipment startup reports, organized by systems and subsystems.
- 5. Functional Performance Tests: Functional performance test checklists for all equipment, systems, subsystems, interlocks, and system interfaces organized by systems and subsystems shall be provided by the Contractor to the Commissioning Agent for inclusion in the Report.
- 6. Operation and Maintenance Manuals: Copies of approved operation and maintenance manuals specified in the systems Contract Documents and/or in the Commissioning Plan shall be provided by the Contractor to the Commissioning Agent for inclusion in the Report.
- 7. Video-Tape: Copies as indicated in the Contract Documents shall be provided by the Contractor to the Commissioning Agent for inclusion in the Report.

## 3.5 ACCEPTANCE

- A. Documents to Owner: The Commissioning Agent shall be responsible for maintaining the commissioning documentation until Final Acceptance of the project. All checklists required by this Section shall become part of the commissioning documentation. The commissioning documentation shall be kept current and shall always be available for inspection. At the time of final acceptance of the project, the Commissioning Agent shall furnish one hard copy and one electronic copy (located on a USB thumb drive) of the commissioning documentation to the Owner.
- B. Warranties: All equipment and system guarantees and warranties specified in the Contract Documents shall be furnished to the Owner by the Contractor at the time of final acceptance of the project.

END OF SECTION 230800

## SECTION 230900 - AUTOMATIC TEMPERATURE CONTROLS

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General Conditions, Division 01 Specification Sections, and Section 230100, "Mechanical General Provisions," apply to work of this Section.
- B. Original construction drawings are not available and therefore the Contractor will need to complete field investigations to verify conditions. The modifications to the Automatic Temperature Controls will be part of the Bid Alternate 01 only and are not included in the base bid where thermostats are only to be relocated.

#### 1.2 SCOPE OF WORK

- A. The Building Automation System (BAS) manufacturer shall furnish and install a fully integrated building automation system, incorporating direct digital control (DDC) for energy management, equipment monitoring and control, and subsystems with open communications capabilities as herein specified. The BAS Contractor shall base his Bid on the system as specified, the sequence of operations, the points list, and Contract Documents. <u>Regardless of the points listed in these documents</u>, the Contractor shall provide the number of points, the types of points, and other controls as required for the sequence of operations.
- B. It shall be the responsibility of the BAS Contractor to fully coordinate with all equipment suppliers, and with the fire alarm system designer/installer to provide a complete functional control system.
- C. The installation of the control system shall be performed under the direct supervision of the controls manufacturer with the shop drawings, flow diagrams, bill of materials, component designation or identification number and sequence of operation all bearing the name of the manufacturer. The installing manufacturer shall certify in writing that the shop drawings have been prepared by the equipment manufacturer and that the equipment manufacturer has supervised their installation. In addition, the equipment manufacturer shall certify, in writing, that the shop drawings were prepared by their company and that all temperature control equipment was installed under their direct supervision.
- D. All materials and equipment used shall be standard components, regularly manufactured for this and/or other systems and not custom designed specifically for this project. All systems and components shall have been thoroughly tested and proven in actual use for at least 2 years.
- E. BAS manufacturer shall be responsible for all BAS and Temperature Control wiring for a complete and operable system. All wiring shall be done in accordance with all local and national codes. Provide a new data drop for each new mechanical unit. Contractor shall run

all cable required from the rack to the RTU. Contractor shall also provide termination of cable at rack location. Contractor shall coordinate final termination with owner IT Department representative to be ready for plug in.

F. The BAS Contractor shall provide bi-weekly trending of HVAC points during the warranty period. The Contractor shall analyze the trends and report any unusual conditions to the General Contractor, Mechanical Contractor, Facilities Planning Project Manager, and School Plant HVAC Technicians. Trends and status reports shall be emailed to all listed parties for records and actions required.

## 1.3 WORK BY OTHERS

- A. The Automatic Temperature Controls Contractor shall provide the required branch circuitry (conduit and conductors) between each HVAC Control Panel and electrical panels with spare breakers labeled as "HVAC Controls". The Automatic Temperature Controls Contractor shall coordinate this work with the electrical contractor. Termination at circuit breakers shall be performed by the electrical contractor.
- B. All control and power wiring required for temperature control system and all interlocking and accessory control wiring required for equipment installed under Division 23 Sections shall be installed by the Temperature Control Contractor.
- C. The Electrical Contractor shall be responsible for wiring of any electrical sub-metering devices furnished by BAS manufacturer.

## 1.4 QUALITY ASSURANCE

- A. The BAS system shall be designed and installed, commissioned and serviced by manufacturer employed, factory trained personnel. Manufacturer shall have an in-place support facility within 50 miles of the site with technical staff, spare parts inventory and necessary test and diagnostic equipment. Distributors or licensed installing contractors are not acceptable.
  - 1. The manufacturer shall provide full time, on site, experienced project manager for this work, responsible for direct supervision of the design, installation, start up and commissioning of the BMS.
  - 2. The Bidder shall be regularly engaged in the manufacturing, installation, and maintenance of BMS systems and shall have a minimum of 10 years of demonstrated technical expertise and experience in the manufacture, installation and maintenance of BMS systems similar in size and complexity to this project. A maintained service organization consisting of at least ten (10) competent servicemen for a period of not less than 10 years and provide a list of ten projects, similar in size and scope to this project, completed within the last 5 years.
- B. Materials and equipment shall be the catalogued products of manufacturers regularly engaged in production and installation of automatic temperature control systems and shall be manufacturer's latest standard design that complies with the Specification requirements.

- C. All BAS peer-to-peer network controllers, central system controllers, and local user displays shall be UL-Listed under Standard UL 916, category PAZX; Standard ULC C100, category UUKL7; and under Standard UL 864, categories UUKL, UDTZ, and QVAX, and be so listed at the time of bid. All floor level controllers shall comply, at a minimum, with UL Standard UL 916, category PAZX; Standard UL 864, categories UDTZ, and QVAX, and be so listed at the time of bid.
- D. The BAS peer-to-peer network controllers and local user display shall also comply with the Australian Electromagnetic Compatibility (EMC) Framework, and bear the C-Tic Mark to show compliance. The purpose of the regulation is to minimize electromagnetic interference between electronic products, which may diminish the performance of electrical products or disrupt essential communications.
- E. DDC peer-to-peer Controllers shall be compliant with the European EMC Directive, Standards EN 50081-2 and EN 50082-2, at the Industrial Levels. Additionally, the equipment shall be compliant with the European LVD Directive and bear the CE mark in order to show compliance to both Directives.
- F. All electronic equipment shall conform to the requirements of FCC Regulation, Part 15, Governing Radio Frequency Electromagnetic Interference and be so labeled.
- G. The manufacturer of the Building Automation System shall provide documentation supporting compliance with ISO-9002 (Model for Quality Assurance in Production, Installation, and Servicing) and ISO-140001 (The application of well-accepted business management principles to the environment). The intent of this Specification requirement is to ensure that the products from the manufacturer are delivered through a Quality System and Framework that will assure consistency in the products delivered for this project.
- H. This system shall have a documented history of compatibility by design for a minimum of 15 years. Future compatibility shall be supported for no less than 10 years. Compatibility shall be defined as the ability to upgrade existing field panels to current level of technology, and extend new field panels on a previously installed network.
  - 1. Compatibility shall be defined as the ability for any existing field panel microprocessor to be connected and directly communicate with new field panels without bridges, routers, or protocol converters.

## 1.5 SUBMITTALS

- A. Submit six complete sets of documentation in the following phased delivery schedule:
  - 1. Equipment data cut sheets
  - 2. System schematics, including:
    - a. sequence of operations
    - b. point names
    - c. point addresses
    - d. interface wiring diagrams
    - e. panel layouts

- f. system riser diagrams
- 3. Auto-CAD compatible as-built drawings
- B. Upon project completion, submit operation and maintenance manuals, consisting of the following:
  - 1. Index sheet, listing contents in alphabetical order
  - 2. Manufacturer's equipment parts list of all functional components of the system
  - 3. Auto-CAD disk of system schematics, including wiring diagrams
  - 4. Description of sequence of operations
  - 5. As-Built interconnection wiring diagrams
  - 6. Operator's Manual
  - 7. Trunk cable schematic showing remote electronic panel locations and all trunk data
  - 8. List of connected data points, including panels to which they are connected and input device (ionization detector, sensors, etc.)
  - 9. Conduit routing diagrams
- C. Control submittals must be approved by Mechanical Engineer before unit is started.

#### 1.6 WARRANTY

- A. Provide all services, materials and equipment necessary for the successful operation of the entire BAS system for a period of one year after beneficial use.
- B. The adjustment, required testing, and repair of the system includes all computer equipment, transmission equipment, and all sensors and control devices.
- C. The on-line support services shall allow the local BAS subcontractor to dial out over telephone lines to monitor and control the facility's BAS. This remote connection to the facility shall be within 2 hours of the time that the problem is reported. This coverage shall be extended to include normal business hours, after business hours, weekends, and holidays.
  - 1. If the problem cannot be resolved on-line by the local office, the national office of the BAS manufacturer shall have the same capabilities for remote connection to the facility. If the problem cannot be resolved with on-line support services, the BAS manufacturer shall dispatch the appropriate personnel to the job site to resolve the problem within 2 hours of the time that the problem is reported.

## PART 2 - PRODUCTS

## 2.1 ACCEPTABLE MANUFACTURERS

- A. Siemens Industries, Inc.
- B. Honeywell

- C. Johnson Controls
- D. Trane

## 2.2 NETWORKING COMMUNICATIONS

- A. The BAS network communications shall communicate across the Suffolk Public Schools existing Ethernet LAN/WAN. The BAS operator workstation server shall reside on this Ethernet network. Access to this server shall be from any LAN/WAN connection on the Ethernet network or from outside the network utilizing a remote desktop application or virtual private network protocol. As a minimum, five (5) simultaneous users may access the system at one time. The BAS Contractor shall be responsible for providing the required number of graphical software site licenses to meet this requirement.
- B. The design of the BAS shall network operator workstations and stand-alone DDC Controllers. The network architecture shall consist of multiple levels for communication efficiency, a campus-wide (Management Level Network) Ethernet network based on TCP/IP protocol, high performance peer-to-peer building level network(s), and DDC Controller floor level local area networks with access being totally transparent to the user when accessing data or developing control programs.
- C. The design of BAS shall allow the co-existence of new DDC Controllers with existing DDC Controllers in the same network without the use of gateways or protocol converters.
  - 1. System shall have the capability to be an OPC Client and Server for dynamic communication with OPC Clients or Servers over an Ethernet network. At a minimum, the following must be supported:
    - a. Data Access 1.0 (96), 1.0A (97) and 2.0 (11/98)
    - b. Alarms & Events 1.0 (1/99)
- D. Peer-to-Peer Building Level Network:
  - 1. All operator devices shall have the ability to access all point status and application report data or execute control functions for any and all other devices via the peer-to-peer network. No hardware or software limits shall be imposed on the number of devices with global access to the network data at any time.
  - 2. The peer-to-peer network shall support a minimum of 100 DDC Controllers and PC workstations.
  - 3. Each PC workstation shall support a minimum of four peer-to-peer networks hardwired or dial up.
  - 4. The system shall support integration of third party systems (fire alarm, security, lighting, PCL, rooftop units) via panel-mounted open protocol processor. This processor shall exchange data between the two systems for interprocessor control. All exchange points shall have full system functionality as specified herein for hardwired points.
  - 5. Field panels must be capable of integration with open standards, including Modbus, BACnet, and LonWorks, as well as with third party devices via existing vendor protocols.

- 6. The peer-to-peer Building Level Network shall use the TCP/IP over Ethernet. All devices must:
  - a. Auto-sense 10/100 Mbps networks.
  - b. Receive an IP Address from a Dynamic Host Configuration Protocol (DHCP) Server or be configured with a Fixed IP Address.
  - c. Resolve Name to IP Addresses for devices using a Domain Name Service (DNS) Server on the Ethernet network.
  - d. Allow access using Telnet.

#### 2.3 DDC CONTROLLER FLOOR LEVEL NETWORK

A. This level communication shall support a family of application specific controllers and shall communicate with the peer-to-peer network through DDC Controllers for transmission of global data.

#### 2.4 DDC AND HVAC MECHANICAL EQUIPMENT CONTROLLERS

- A. The DDC and HVAC Mechanical Equipment Controllers shall reside on the Building Level Network.
- B. DDC and HVAC Mechanical Equipment Controllers shall use the same programming language and tools. DDC and HVAC Mechanical Equipment Controllers that require different programming language or tools on a network are not acceptable.
- C. DDC and HVAC Mechanical Equipment Controllers that do not meet the functions specified in Section D for DDC Controllers, Section E for HVAC Mechanical Equipment Controllers are not acceptable.
- D. DDC Controller:
  - 1. DDC Controllers shall be a 16-bit stand-alone, multi-tasking, multi-user, real-time digital control processors consisting of modular hardware with plug-in enclosed processors, communication controllers, power supplies, and input/output point modules. Controller size shall be sufficient to fully meet the requirements of this Specification and the attached Point I/O Schedule. Each Controller shall support a minimum of three (3) Floor Level Application Specific Controller Device Networks.
  - 2. Each DDC Controller shall have sufficient memory to support its own operating system and databases, including:
    - a. Control processes
    - b. Energy management applications
    - c. Alarm management applications including custom alarm messages for each level alarm for each point in the system.
    - d. Historical/trend data for points specified
    - e. Maintenance support applications
    - f. Custom processes
    - g. Password-protected Operator I/O

- h. Dial-up communications
- i. Manual override monitoring
- 3. Each DDC Controller shall support firmware upgrades without the need to replace hardware.
- 4. Provide all processors, power supplies, and communication controllers so that the implementation of a point only requires the addition of the appropriate point input/output termination module and wiring.
- 5. DDC Controllers shall provide a RS-232C serial data communication ports for operation of operator I/O devices, such as industry standard printers, operator terminals, modems, and portable laptop operator's terminals. DDC Controllers shall allow temporary use of portable devices without interrupting the normal operation of permanently connected modems, printers or terminals.
- 6. As indicated in the Point I/O Schedule, the operator shall have the ability to manually override automatic or centrally executed commands at the DDC Controller via local, point discrete, on-board hand/off/auto operator override switches for digital control type points and gradual switches for analog control type points.
  - a. Switches shall be mounted either within the DDC Controllers key-accessed enclosure, or externally mounted with each switch keyed to prevent unauthorized overrides.
  - b. DDC Controllers shall monitor the status of all overrides and inform the operator that automatic control has been inhibited. DDC Controllers shall also collect override activity information for reports.
- 7. DDC Controllers shall provide local LED status indication for each digital input and output for constant, up-to-date verification of all point conditions without the need for an operator I/O device. Graduated intensity LEDs or analog indication of value shall also be provided for each analog output. Status indication shall be visible without opening the panel door.
- 8. Each DDC Controller shall continuously perform self-diagnostics, communication diagnosis, and diagnosis of all panel components. The DDC Controller shall provide both local and remote annunciation of any detected component failures, low battery conditions, or repeated failure to establish communication.
- 9. Isolation shall be provided at all peer-to-peer network terminations, as well as all field point terminations to suppress induced voltage transients consistent with:
  - a. RF-Conducted Immunity (RFCI) per ENV 50141 (IEC 1000-4-6) at 3 V
  - b. Electro Static Discharge (ESD) Immunity per EN 61000-4-2 (IEC1000-4-2) at 8 kV air discharge, 4 kV contact
  - c. Electrical Fast Transient (EFT) per EN 61000-4-4 (IEC 1000-4-4) at 500 V signal, 1 kV power
  - d. Output Circuit Transients per UL 864 (2,400V, 10A, 1.2 Joule max)
  - e. Isolation shall be provided at all peer-to-peer panel's AC input terminals to suppress induced voltage transients consistent with:
    - 1) IEEE Standard 587-1980
    - 2) UL 864 Supply Line Transients
    - 3) Voltage Sags, Surge, and Dropout per EN 61000-4-11 (EN 1000-4-11)

- 10. In the event of the loss of normal power, there shall be an orderly shutdown of all DDC Controllers to prevent the loss of database or operating system software. Nonvolatile memory shall be incorporated for all critical controller configuration data, and battery backup shall be provided to support the real-time clock and all volatile memory for a minimum of 60 days.
  - a. Upon restoration of normal power, the DDC Controller shall automatically resume full operation without manual intervention.
  - b. Should DDC Controller memory be lost for any reason, the user shall have the capability of reloading the DDC Controller via the local RS-232C port, via telephone line dial-in or from a network workstation PC.
- 11. Provide connection to existing local black and white CRT in the central equipment room for access of the entire facility. No laptop required.
- 12. Graphics: Existing workstations in Central maintenance and other home laptops shall be modified for tie-in to this facility. The BAS Contractor shall create new graphics on all existing workstations identical to existing graphics standard already in the system as follows:
  - a. One per RTU
  - b. Floor Plans
  - c. One Custom Graphics
- E. HVAC Mechanical Equipment Controllers:
  - 1. HVAC Mechanical Equipment Controllers shall be a 12-bit stand-alone, multi-tasking, multi-user, real-time digital control processors consisting of modular hardware with plug-in enclosed processors.
  - 2. Each HVAC Mechanical Controller shall have sufficient memory to support its own operating system and databases, including:
    - a. Control processes
    - b. Energy management applications
    - c. Alarm management applications including custom alarm messages for each level alarm for each point in the system.
    - d. Historical/trend data for points specified
    - e. Maintenance support applications
    - f. Custom processes
    - g. Operator I/O
    - h. Remote communications
  - 3. HVAC Mechanical Equipment Controllers shall provide a RS-232C serial data communication port for operation of operator I/O devices, such as industry standard printers, operator terminals, modems, and portable laptop operator's terminals.
  - 4. HVAC Mechanical Equipment Controllers shall provide local LED status indication for each digital input and output for constant, up-to-date verification of all point conditions without the need for an operator I/O device.
  - 5. Each HVAC Mechanical Equipment Controller shall continuously perform selfdiagnostics, communication diagnosis, and diagnosis of all components. The HVAC Mechanical Equipment Controller shall provide both local and remote annunciation of

any detected component failures, low battery conditions, or repeated failure to establish communication.

- 6. Isolation shall be provided at all peer-to-peer network terminations, as well as all field point terminations to suppress induced voltage transients consistent with:
  - a. RF-Conducted Immunity (RFCI) per ENV 50141 (IEC 1000-4-6) at 3 V
  - b. Electro Static Discharge (ESD) Immunity per EN 61000-4-2 (IEC 1000-4-2) at 8 kV air discharge, 4 kV contact
  - c. Electrical Fast Transient (EFT) per EN 61000-4-4 (IEC 1000-4-4) at 500 V signal, 1 kV power
  - d. Output Circuit Transients per UL 864 (2,400V, 10A, 1.2 Joule max)
- 7. Isolation shall be provided at all peer-to-peer panel's AC input terminals to suppress induced voltage transients consistent with:
  - a. IEEE Standard 587-1980
  - b. UL 864 Supply Line Transients
  - c. Voltage Sags, Surge, and Dropout per EN 61000-4-11 (EN 1000-4-11)
- 8. In the event of the loss of normal power, there shall be an orderly shutdown of all HVAC Mechanical Equipment Controllers to prevent the loss of database or operating system software. Nonvolatile memory shall be incorporated for all critical controller configuration data, and battery backup shall be provided to support the real-time clock and all volatile memory for a minimum of 72 hours.
  - a. Upon restoration of normal power, the HVAC Mechanical Equipment Controller shall automatically resume full operation without manual intervention.
  - b. Should HVAC Mechanical Equipment Controller memory be lost for any reason, the user shall have the capability of reloading the HVAC Mechanical Equipment Controller via the local RS-232C port, via telephone line dial-in or from a network workstation PC.

# 2.5 DDC AND HVAC MECHANICAL EQUIPMENT CONTROLLER RESIDENT SOFTWARE FEATURES

- A. General:
  - 1. The software programs specified in this Section shall be provided as an integral part of DDC and HVAC Mechanical Equipment Controllers and shall not be dependent upon any higher level computer for execution.
  - 2. All points shall be identified by up to 30-character point name and 16-character point descriptor. The same names shall be used at the PC workstation.
  - 3. All digital points shall have user defined two-state status indication (descriptors with minimum of 8 characters allowed per state (i.e., summer/winter)).
- B. Control Software Description:
  - 1. The DDC and HVAC Mechanical Equipment Controllers shall have the ability to perform the following pre-tested control algorithms:

- a. Two-position control
- b. Proportional control
- c. Proportional plus integral control
- d. Proportional, integral, plus derivative control
- e. Automatic tuning of control loops
- C. DDC and HVAC Mechanical Equipment Controllers shall provide the following Energy Management routines for the purpose of optimizing energy consumption while maintaining occupant comfort:
  - 1. Start-Stop Time Optimization (SSTO) shall automatically be coordinated with event scheduling. The SSTO program shall start HVAC equipment at the latest possible time that will allow the equipment to achieve the desired zone condition by time of occupancy. The SSTO program shall also shut down HVAC equipment at the earliest possible time before the end of the occupancy period, and still maintain desired comfort conditions.
    - a. The SSTO program shall operate in both the heating and cooling seasons.
      - 1) It shall be possible to apply the SSTO program to individual fan systems.
      - 2) The SSTO program shall operate on both outside weather conditions as well as inside zone conditions and empirical factors.
    - b. The SSTO program shall meet the local code requirements for minimum outside air while the building is occupied.
  - 2. Event Scheduling: Provide a comprehensive menu driven program to automatically start and stop designated points or groups of points according to a stored time.
    - a. It shall be possible to individually command a point or group of points.
    - b. For points assigned to one common load group, it shall be possible to assign variable time delays between each successive start or stop within that group.
    - c. The operator shall be able to define the following information:
      - 1) Time, day
      - 2) Commands, such as on, off, auto, and so forth.
      - 3) Time delays between successive commands.
    - d. There shall be provisions for manual overriding of each schedule by an appropriate operator.
      - 1) It shall be possible to schedule events up to one year in advance.
      - 2) Scheduling shall be calendar based.
      - 3) Holidays shall allow for different schedules.
  - 3. Temperature-compensated Duty Cycling:
    - a. The DCCP (Duty Cycle Control Program) shall periodically stop and start loads according to various patterns.

- b. The loads shall be cycled such that there is a net reduction in both the electrical demands and the energy consumed.
- 4. Automatic Daylight Savings Time Switchover: The system shall provide automatic time adjustment for switching to/from Daylight Savings Time.
- 5. Night Setback Control: The system shall provide the ability to automatically adjust setpoints for night control.
- 6. The Peak Demand Limiting (PDL) program shall limit the consumption of electricity to prevent electrical peak demand charges.
  - a. PDL shall continuously track the amount of electricity being consumed, by monitoring one or more electrical kilowatt-hour/demand meters. These meters may measure the electrical consumption (kWh), electrical demand (kW), or both.
  - b. PDL shall sample the meter data to continuously forecast the demand likely to be used during successive time intervals.
  - c. If the PDL forecasted demand indicates that electricity usage is likely to exceed a user preset maximum allowable level, then PDL shall automatically shed electrical loads.
  - d. Once the demand peak has passed, loads that have been shed shall be restored and returned to normal control.
- D. DDC and HVAC Mechanical Equipment Controllers shall be able to execute custom, job-specific processes defined by the user, to automatically perform calculations and special control routines.
  - 1. A single process shall be able to incorporate measured or calculated data from any and all other DDC and HVAC Mechanical Equipment Controllers on the network. In addition, a single process shall be able to issue commands to points in any and all other DDC and HVAC Mechanical Equipment Controllers on the network. Database shall support 30-character, English language point names, structured for searching and logs.
  - 2. Processes shall be able to generate operator messages and advisories to operator I/O devices. A process shall be able to directly send a message to a specified device or cause the execution of a dial-up connection to a remote device, such as a printer or pager.
  - 3. DDC and HVAC Mechanical Equipment Controller shall provide a HELP function key, providing enhanced context sensitive on-line help with task orientated information from the user manual.
  - 4. DDC and HVAC Mechanical Equipment Controller shall be capable of comment lines for sequence of operation explanation.
- E. Alarm management shall be provided to monitor and direct alarm information to operator devices. Each DDC and HVAC Mechanical Equipment Controller shall perform distributed, independent alarm analysis and filtering to minimize operator interruptions due to non-critical alarms, minimize network traffic and prevent alarms from being lost. At no time shall the DDC and HVAC Mechanical Equipment Controller's ability to report alarms be affected by either operator or activity at a PC workstation, local I/O device, or communications with other panels on the network.

- 1. All alarm or point change reports shall include the point's English language description and the time and date of occurrence.
- 2. The user shall be able to define the specific system reaction for each point. Alarms shall be prioritized to minimize nuisance reporting and to speed operator response to critical alarms. A minimum of six priority levels shall be provided for each point. Point priority levels shall be combined with user definable destination categories (PC, printer, DDC Controller, etc.) to provide full flexibility in defining the handling of system alarms. Each DDC and HVAC Mechanical Equipment Controller shall automatically inhibit the reporting of selected alarms during system shutdown and start-up. Users shall have the ability to manually inhibit alarm reporting for each point.
- 3. Alarm reports and messages will be directed to a user-defined list of operator devices or PCs based on time (after-hours destinations) or based on priority.
- 4. In addition to the point's descriptor and the time and date, the user shall be able to print, display, or store a 200-character alarm message to more fully describe the alarm condition or direct operator response.
- 5. In dial-up applications, operator-selected alarms shall initiate a call to a remote operator device.
- F. A variety of historical data collection utilities shall be provided to manually or automatically sample, store and display system data for points as specified in the I/O Summary. The entire collection process shall be automated so that the data collection definition, amount of data to be collected, collection report, and scheduling take the form of a wizard, or on-line assist utility, in order to complete this process within a short amount of time for a large group of points. Ability to produce a summary of changes in a log file.
  - 1. Any point, physical or calculated, may be designated for trending. Any point, regardless of physical location in the network, may be collected and stored in each DDC and HVAC Mechanical Equipment Controllers point group. Two methods of collection shall be allowed: either by a pre-defined time interval or upon a pre-defined change of value. Sample intervals of 1 minute to 7 days shall be provided. Each DDC and HVAC Mechanical Equipment Controller shall have a dedicated RAM-based buffer for trend data and shall be capable of storing a minimum of 100 data samples. All trend data shall be available for transfer to a Workstation without manual intervention.
    - a. Time-interval based trending shall have the capability of synchronizing the trend sampling of discrete points. This allows for the comparison of values of several different points at the same moment in time.
    - b. Trended points shall have the option of sampling data values based on the condition of a "trigger" point. (i.e., conditional trending). Options for sampling shall include: always sampling as defined, only sampling when the trended point is in the alarm condition, or not sampling.
  - 2. DDC and HVAC Mechanical Equipment Controllers shall also provide high resolution sampling capability for verification of control loop performance. Operator-initiated automatic and manual loop tuning algorithms shall be provided for operator-selected PID control loops as identified in the point I/O Summary.
    - a. Loop tuning shall be capable of being initiated either locally at the DDC and HVAC Mechanical Equipment Controller, from a network workstation, or

remotely using dial-in modems. For all loop tuning functions, access shall be limited to authorized personnel through password protection.

- G. DDC and HVAC Mechanical Equipment Controllers shall be capable of automatically accumulating and storing run-time hours for digital input and output points and automatically sample, calculate, and store consumption totals for analog and digital pulse input type points, as specified in the point I/O Schedule.
- H. The peer-to-peer network shall allow the DDC and HVAC Mechanical Equipment Controllers to access any data from or send control commands and alarm reports directly to any other DDC and HVAC Mechanical Equipment Controller or combination of controllers on the network without dependence upon a central or intermediate processing device. DDC and HVAC Mechanical Equipment Controllers shall send alarm reports to multiple workstations without dependence upon a central or intermediate processing device. The peer-to-peer network shall also allow any DDC and HVAC Mechanical Equipment Controller to access, edit, modify, add, delete, backup, and restore all system point database and all programs.
- I. The peer-to-peer network shall allow the DDC and HVAC Mechanical Equipment Controllers to assign a minimum of 50 passwords access and control priorities to each operator individually. The logon password (at any PC workstation or portable operator terminal) shall enable the operator to monitor, adjust, and control the points that the operator is authorized for. All other points shall not be displayed on the PC workstation or portable terminal (e.g., all base building and all tenant points shall be accessible to any base building operators, but only tenant points shall be accessible to tenant building operators). Passwords and priorities for every point shall be fully programmable and adjustable.
  - 1. Passwords shall have the option to be configured to expire within a selected timeframe (1-365 days).
  - 2. Configuring the password expiration shall also enable the functionality to lock-out a user account after three failed log-on attempts.

## 2.6 PERSONAL COMPUTER OPERATOR WORKSTATION HARDWARE

- A. Compatibility requires the existing central computer to store all databases and software programs for immediate automatic download to this facility as well as perform the functions specified below. The Contractor shall upload programs and databases for this facility to the central computer.
- B. Load database and HVAC programs for retrieval and automatic downloading to the building network.

## 2.7 FIELD DEVICES

A. Provide instrumentation as required for monitoring, control, or optimization functions. All devices and equipment shall be approved for installation in the Suffolk Public Schools.

## 2.8 MISCELLANEOUS DEVICES

A. Smoke Detectors (By Electrical Contractor)

#### PART 3 - EXECUTION

#### 3.1 PROJECT MANAGEMENT

- A. Provide a designated project manager who will be responsible for the following:
  - 1. Construct and maintain project schedule
  - 2. On-site coordination with all applicable trades and subcontractors
  - 3. Authorized to accept and execute orders or instructions from owner/architect/engineer
  - 4. Attend project meetings as necessary to avoid conflicts and delays
  - 5. Make necessary field decisions relating to this scope of work
  - 6. Coordination/Single point of contact

#### 3.2 START-UP AND COMMISSIONING

- A. When installation of the system is complete, calibrate equipment and verify transmission media operation before the system is placed on-line. All testing, calibrating, adjusting and final field tests shall be completed by the installer. Verify that all systems are operable from local controls in the specified failure mode upon panel failure or loss of power. Smoke control action for each fan and damper shall be tested.
- B. Provide any recommendation for system modification in writing to owner. Do not make any system modification, including operating parameters and control settings, without prior approval of owner.

## 3.3 TRAINING

- A. Provide 16 hours of training for Owner's designated operating personnel. Training shall include:
  - 1. Explanation of drawings, operations and maintenance manuals
  - 2. Walk-through of the job to locate control components
  - 3. Operator workstation and peripherals
  - 4. DDC controller and ASC operation/function
  - 5. Operator control functions including graphic generation and field panel programming
  - 6. Operation of portable operator's terminal
  - 7. Explanation of adjustment, calibration and replacement procedures
- B Since the Owner may require personnel to have more comprehensive understanding of the hardware and software, additional training must be available from the Contractor. If such training is required by the Owner, it will be contracted at a later date.
# 3.4 INSTALLATION

- A. Low voltage code approved plenum cable may be used above ceilings without EMT. All wiring in equipment rooms and exposed locations shall be in 3/4" minimum EMT.
- B. The Automatic Temperature Controls Contractor shall be responsible for providing circuit breakers and power wiring and conduit from electrical panels installed under Division 26 to Automatic Temperature Controls panels. In addition, the Automatic Temperature Controls Contractor shall provide EMT conduit in walls for all thermostats. All EMT shall be a minimum of 3/4" diameter.

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# SECTION 260100 - ELECTRICAL GENERAL PROVISIONS

#### 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 SCOPE OF WORK

- A. This Section of the Specifications describes the material and installation procedures to be followed for furnishing and installing the electrical equipment and material as outlined and described on the contract drawings and as stated in this Division of the Specifications.
- B. Where the word "Contractor" appears in this Division of the Specifications, it applies to the Contractor performing the electrical portion of the work, unless specifically indicated otherwise.
- C. The Contractor shall install the systems as specified herein and indicated on the contract drawings and shall furnish all labor, material, tools, scaffolds, erection equipment, services and other items of expense as necessary as a part of this Contract. This Contract further includes placing the systems into operation and properly testing, adjusting, balancing and training the owner's personnel on the use of all items of equipment as specified and as approved by the Architect.

#### 1.3 SUPERVISION

A. The Electrical Contractor shall have a competent and English speaking designated Supervisor who is a Certified Master Electrician on the job site at all times that any electrical work is being performed. This shall include any and all electrical work being accomplished by contractors who are subcontractors to the prime Electrical Contractor.

#### 1.4 DRAWINGS

A. General arrangements of the necessary conduits, feeders, light fixtures, devices, panels, and equipment are indicated on the drawings in diagrammatic form only. Due to the scale of the drawings, offsets, fittings, and accessories may not be shown. Work indicated but having details omitted shall be provided complete to an operating condition with all fittings, wiring, and ancillary equipment and material as required. Where rearrangement is necessary, submit drawings of proposed changes for approval and coordinate and arrange work with consideration to the architectural, structural, mechanical, plumbing, and sprinkler system drawings, the existing building conditions and to the work of the various other building trades. Equipment provided under this Division of the Specifications shall be

installed in accordance with the recommendations of the equipment or material manufacturer.

# 1.5 COORDINATION

- A. Coordinate the electrical work with the architectural, structural, mechanical, plumbing, and sprinkler system drawings and work in order to avoid omissions and to eliminate any interference. Report any discrepancies found, as soon as possible, after discovery, to the Architect.
- B. The contractor shall be responsible for coordinating with the Division 23 Contractor for providing properly sized circuit breakers to serve mechanical equipment and motors furnished which differ from that specified or indicated. This shall be further understood to include branch circuit wiring, conduit, disconnect switches, etc., in accordance with the appropriate codes and specifications. The cost of providing this increased electrical service and related work shall be included under the applicable section under which the equipment and motors are being furnished, at no additional cost to the Owner.
- C. The contractor shall coordinate the following electrical requirements for all mechanical equipment with the Division 23 Contractor:
  - 1. Number of electrical connections.
  - 2. Number and size of feeders' terminal lugs.
  - 3. Maximum overcurrent protection.
  - 4. Size and type of fuses.

#### 1.6 CODES AND STANDARDS

A. Various recognized codes and standards form a part of these Specifications the same as if written fully herein and shall be followed as minimum requirements. The codes and standards will be referred to by their abbreviated names and are listed below. Reference to these standards shall be understood to mean the latest edition and accumulative supplements which have been adopted by the "Authority Having Jurisdiction," unless noted otherwise.

ASAD	ADA Standards for Accessible Design
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
CBMA	Certified Ballast Manufacturers Association
ICC	International Code Council
ICEA	Insulated Cable Engineers Association
IECC	International Energy Conservation Code
IEEE	Institute of Electrical and Electronics Engineers
IESNA	Illuminating Engineering Society of North America
LEED	Leadership in Energy and Environmental Design
NEC 2020	National Electrical Code
NEMA	National Electrical Manufacturers Association
NESC	National Electrical Safety Code

NFPA	National Fire Prevention Association
NFPA 70E	Standard for Electrical Safety in the workplace
OSHA	The Occupational Safety and Health Act
UL	Underwriters Laboratories, Inc.
VUSBC	Virginia Uniform Statewide Building Code, 2021 Edition

B. All equipment, material, apparatus, and work shall conform to the requirements of the NEC. If the Contractor observes that the drawings and specifications are at variance therewith, the contractor shall notify the Architect in writing. If the Contractor performs such work contrary to the above referenced rules and regulations and without written acknowledgment or notice thereto, they shall correct this work and bear all cost arising therefrom.

#### 1.7 NOTICES AND FEES

A. Give all required notices, obtain all necessary permits, and pay all required fees, including any fees associated with temporary electrical power services during construction. Utility company fees, which are for the permanent installation of electrical power services, shall be paid for by the Owner.

### PART 2 - PRODUCTS

### 2.1 EQUIPMENT AND MATERIALS

A. Refer to Specification 013300 "Submittals", for shop drawing submittal procedures. Submit shop drawings for materials required for this project as indicated herein. Obtain approval from the Architect before manufacture is started on any of same. The shop drawings shall show complete details of the various items, wiring diagrams, etc., and shall be submitted in a sufficient number of copies to allow the Engineer to retain one copy. Approved copies of all shop drawings shall be kept on the job site accessible to the Architect at all times.

#### 2.2 ACCEPTABLE MANUFACTURERS

A. The following list states specific names of acceptable manufacturers of particular equipment and indicates the types of material on which submittals shall be made:

Submittal Information <u>Required</u>:

NOTE: If substitute light fixtures are submitted for review, provide catalog data on the substitution which will provide all the information required to compare it to the specified product. At a minimum, provide dimensional and weight data, coefficients of utilization

(CU) information, and photometrics for both the specified and substitute light fixtures. Provide the same catalog data on the specified fixture also. Submittals which don't include both sets of catalog cuts will be returned marked "Furnish Specified Item".

Disconnect Switches......Product Data General Electric / ABB Company Square D Company Eaton/Cutler-Hammer Siemens Wiring Devices and Cover Plates ......Product Data Hubbell Leviton Arrow-Hart Pass and Seymour Surface Metal Raceway .....Product Data Wiremold Hubbell Incorporated Mono Systems

B. The following list states other materials for which product data submittals shall be made:

Circuit Breakers (each type) Conductors (each type) Conduit (each type) Data Network Cabling and Components Emergency Battery Ballast Fire Alarm System Components Fuses (each type) Intrusion Detection System Components Integrated Communication System Components LED Drivers MC Cable (each type) Occupancy Sensing Switches (all types) Photo Electric Cells Surface Metal Raceway (including all accessory components)

- C. Catalog numbers and manufacturers are listed as a guide for minimum requirements to be met. Material and equipment of manufacturers other than those listed will be given consideration by the Architect providing the material meets the minimum requirements set forth in these Specifications and providing the material or equipment will provide satisfactory performance for the intended installation, does not exceed the dimensions and weight of the specified item and meets the aesthetic performance desired of the specified item. Submittals of other than specified equipment shall have indicated on the specifications by paragraph and subparagraph numbers and/or letters.
- D. Refer to Specification Section 012500 for substitution requirements.

- E. Any deviation from the manufacturers listed in the preceding list and /or of those stated in the Contract Documents shall be submitted to the Architect for approval in accordance with Specification Section 260500, "Materials and Methods." Facsimile transmission of data for review will not be accepted.
- F. The Engineer will review for approval, only one substitute for each type of material specified in the Division 26 Contract Documents. If the substitute material is not approved, the Contractor shall provide the material by one of the specified manufacturers. Approval of substitute material is at the sole discretion of the Architect and Owner, and the Contractor shall bear all costs arising therefrom, including any design fees if additional design effort is deemed prudent or necessary by the Architect.
- G. Only the types of materials specified herein are approved for use on this project. No other material types will be considered.

# PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. "Provide," as used on the drawings and in these Specifications, shall mean furnish, install, connect, adjust, test, and place into operation, except where otherwise specifically stated in the contract documents.
- B. Provide coordinated electrical systems, equipment, and material complete with auxiliaries and accessories as required for a complete and operable finished project.
- C. Run all conduits concealed except where specifically indicated otherwise. Exposed conduit installation other than where indicated shall be approved by the Architect and Owner prior to installation.

# 3.2 CLEANING

- A. Remove all dirt, trash, and oil from all raceways, boxes, fittings, cabinets, and panelboards.
- B. Protect, to the satisfaction of the Architect, all equipment provided against damage during construction. If damage does occur to any materials, refinish, repair, or replace the equipment or material as directed by the Architect.

#### 3.3 REPAIR OF EXISTING WORK

- A. Repair of existing work, demolition, and modification of existing electrical distribution systems shall be performed as follows:
  - 1. Workmanship: Lay out work in advance.

- a. Exercise care when cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, or other surfaces as necessary for proper installation, support, or anchorage of conduit, raceways, or other electrical work. Repair damage to buildings and materials or equipment damaged using skilled craftsmen of the appropriate trades.
- 2. Existing Concealed Wiring to be Removed:
  - a. Existing concealed wiring to be removed shall be disconnected from its source. Remove conductors and cut conduits flush with concrete floors, and top openings with non-shrink grout. Where wood floors are encountered, remove conduit to below wood floor. Where conduit that passes through walls is removed, seal opening in wall with a material that is equal to the fire rating of the material the wall is constructed from.
- 3. Continuation of Service:
  - a. Maintain continuity of existing circuits to remain. Existing circuits shall remain energized unless otherwise indicated. Circuits which are to remain but were disturbed during demolition shall have circuit wiring and power restored back to original condition as approved by the Architect. Only materials specified for this project may be used to affect repairs.

#### 3.4 EXCAVATION

A. All excavations shall be made to the proper depth to assure a firm foundation for the work.

# 3.5 RECORD DRAWINGS

A. Refer to Specification Section 017839 "Project Record Documents".

#### 3.6 OPERATION AND MAINTENANCE MANUALS

A. Refer to Specification Section 017823 "Operation and Maintenance Data".

The following list states materials for which Operation and Maintenance Data submittals shall be made:

Data Network Cabling and Components Fire Alarm System Components Light Fixtures Power Distribution Equipment (Disconnect Switches) Occupancy Sensing Switches (all types)

# 3.7 EQUIPMENT INVENTORY

- A. Provide a complete equipment inventory for all Electrical Equipment listed below. Refer to Appendix A in this section for the required template. A separate form shall be provided for each new piece of equipment provided.
- B. Prior to substantial completion, submit the equipment inventory forms for review. Once approved, include the forms in the operation and maintenance manual.

The following list states materials for which equipment inventory shall be made:

Data Network Cabling and Components Fire Alarm System Components Light Fixtures Power Distribution Equipment (Disconnect Switches) Occupancy Sensing Switches (all types)

# APPENDIX A

# **New Equipment Inventory**

Project Name: (Add Project Name)
Project Address: (Add Project Address)
Description of Item:
Classification:
<ul> <li>Lighting</li> <li>Power Distribution</li> <li>Auxiliary Systems</li> </ul>
Building:
Equipment Location (Room Number):
Date Purchased:
Date Placed in Service:
Original Cost:
Life Expectancy (years):
Estimated Replacement Date:
Estimated Replacement Cost:
Manufacturer:
Model/Serial #:

# SECTION 260500 - MATERIALS AND METHODS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and General provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

#### 1.2 SCOPE OF WORK

- A. Provide all labor, material, tools, scaffolds, erection equipment, services and supplies to fabricate, install, connect, adjust, test, and place in operation the electrical and other systems as called for in these Specifications and as indicated on the Contract Drawings.
- B. Properly store and protect all material and equipment until installed.
- C. All material and equipment shall be new and of the quality noted or specified. Material, equipment, and work of inferior quality will be rejected and shall be removed from the job site immediately upon rejection and replaced. Unacceptable work shall be removed and replaced. All replacement material and work shall be done at the Contractor expense. The Architect will decide upon the quality of material and equipment furnished and of the work performed.

#### 1.3 WARRANTIES

- A. The Contractor shall provide the Owner with a one-year, unlimited material and labor warranty on all work accomplished and materials provided under Division 26, 27, 28, including all components thereof except as otherwise noted herein or in other specifications. The warranty start date is the date of project "Substantial Completion" as determined by the Architect. All warranties shall be submitted as part of the shop drawing submittals.
- B. Electronic LED drivers shall be free from defect in material and workmanship for a period of five (5) years from the date of project "Substantial Completion" as determined by the Architect.

# PART 2 - PRODUCTS

### 2.1 MATERIAL

A. Electrical material furnished under these Specifications shall be new and listed by UL and shall bear the UL label where labeling service is available for the type of material provided for this project.

### 2.2 RACEWAYS

- A. Raceways shall be of the size indicated or as required by the NEC; whichever is the larger; except where larger conduits are specified on the Contract Drawings. Raceways shall be 1/2" minimum.
- B. Raceways shall be provided for all electrical systems indicated on the drawings unless specifically indicated otherwise. Raceways shall be hot-dip galvanized rigid steel conduit (GRS), electrical metallic tubing (EMT), flexible steel conduit, or intermediate metallic conduit (IMC). Flexible steel conduit installed outdoors shall be liquid tight.

### 2.3 CONDUCTORS

- A. Conductors shall be of the American Wire Gauge size indicated on the contract drawings or specified herein.
- B. All conductors shall be copper. The use of Aluminum conductors is not permitted.

#### 2.4 OUTLETS

- A. Outlet and junction boxes shall be of one-piece galvanized construction of a type and size applicable for use in the location indicated on the contract drawings and as required by the NEC.
- B. Locations of outlets for lighting, devices, power, and equipment are indicated on the contract drawings. Owing to the small scale of the drawings, it is not possible to indicate the exact location. Examine the architectural, structural, mechanical, sprinkler system and plumbing drawings, and finish conditions and arrange work as required to meet such conditions to the approval of the Architect.
- C. Verify the exact swing of doors and locations of furniture and built-in cabinetry prior to installing outlets for switches and receptacles and make the necessary adjustments in location and mounting height of same to avoid conflicts at no additional cost. Coordinate outlets with change orders, addenda, and job site differences.

# 2.5 FUSES

- A. All fuses shall be provided by the Electrical Contractor.
- B. Fuses shall be as follows:
  - 1. General: All fuses must carry the UL inspected label. All fuses shall be plainly marked with ampere rating, voltage rating, interrupting capacity when greater than 10,000 Amperes and current limiting where it applies, and the name of the trademark of the manufacturer.
  - 2. Interrupting Capacity: Each fuse shall be capable of safely interrupting the maximum short-circuit current available at the point in the circuit where installed.
  - 3. Coordination: Service fuses and the fuses installed in feeder circuits shall be coordinated to provide a selective system of over-current protection.
- C. Main, feeder, and branch circuit fuses shall be as follows:
  - 1. Circuits 0 to 600 amperes shall be protected by BUSSMANN Low-Peak, Limitron, or Fusetron (RK5, 200,000 I/C) Fuses rated as indicated on the drawings.
  - 2. Motor Circuits: All motors rated 480 volts or less shall be protected by dual-element fuses rated not in excess of 175% and not less than 125% of motor nameplate rating or as indicated. Larger motors as indicated on drawings where fuse gaps are larger than size required for proper rating of fuse, install "all-metal" fuse reducers.

#### 2.6 LABELING

- A. Label all disconnect switches provided under Division 26 of these Specifications.
- B. Labels shall be machine engraved, laminated, Bakelite, nameplate type. Labels shall have black faces with white letters.
- C. Size of labels shall be based on the required lettering and lettering size. The following are the minimum requirements for each type of label:
  - 1. Disconnect Switches: Disconnect switches shall be labeled in 1/4" high letters. The First line shall state what the switch is feeding. The Second line shall state from which circuit and panel the switch is fed.
- D. Circuit breakers serving Fire Alarm Control Panels shall be provided with a red, Bakelite nameplate with white letters attached to the panel adjacent to the circuit breaker.
- E. Attach labels with a minimum of two rivets or sheet metal screws. Adhesive-backed labeling will not be accepted.

# 2.7 PULL BOXES

A. Install pull boxes at all necessary points, whether indicated on the drawings or not, to prevent injury to conductor insulation or other damage that might result from pulling

resistance or for other reasons necessary for proper installation. Minimum dimensions shall not be less than the NEC requirements and shall be increased if necessary for practical reasons or where required to fit the job condition.

- B. Above grade pull boxes shall be constructed of galvanized sheet steel, code gauge, except that not less than 12-gauge shall be used for any box. Where boxes are used in connection with exposed conduit, plain covers attached to the box with a suitable number of countersunk flathead machine screws may be used.
- C. All junction and pull box covers shall be labeled indicating the circuits contained therein in a manner that will prevent unintentional interference with circuits during testing and servicing. For example: "HE1-13." See Specification Section 260534 for additional labeling requirements.

### 2.8 DISCONNECT SWITCHES

- A. Disconnect switches shall conform to governing industry NEMA standards. They shall be listed by UL. Disconnect switches shall be NEMA standard HD, quick-make, quick-break type, and capable of being locked in the off position.
- B. Where disconnect switches are indicated or required by the NEC to be weatherproof, furnish NEMA 3R enclosures.

# 2.9 BRANCH CIRCUITS

- A. The branch circuit wiring has been designed to utilize the advantages of multi-wire distribution and shall be installed substantially as indicated on the drawings. Major changes in the grouping or general routing of the branch circuits require prior approval in writing from the Architect/Engineer.
- B. The number of conductors in each run of conduit is indicated on the drawings, but where there is a conflict between the number of wires indicated and the actual number required as determined by the functional requirements of the connected load, or where the number of wires was inadvertently omitted from the drawings, the correct number and size of wires as determined by the functional requirements of the connected load shall govern and be provided at no additional cost.
- C. Where individual 120V or 277V homerun circuits are shown on the drawings, they may be combined as follows:
  - 1. No more than three phase conductors plus three neutrals and one ground per conduit.
  - 2. No two of the same phase conductor per conduit.
  - 3. Provide 120V circuits with individual neutrals per circuit. Neutrals may not be shared.
  - 4. Neutral sharing by 277V circuits is acceptable.

# 2.10 MOTOR AND CONTROLLER DISCONNECTING MEANS

A. Provide a disconnecting means for each motor, where indicated on the drawings. A circuit breaker in a panelboard, horsepower rated switch, or type specified under Article 430 and 440 of the NEC will be acceptable as a disconnecting means, if readily accessible and if located within sight of the motor and in compliance with all codes. A quick-make and quick-break general use tumbler or snap switch will be acceptable for capacities of 20 amperes or less and 300 volts and less, provided the ampere rating of the switch is at least double the rating of the equipment controlled. Switches of 30- to 400-ampere capacity shall be of the enclosed, quick-make and quick-break type, heavy duty, horsepower rated. Switches shall disconnect all ungrounded conductors and shall disconnect grounded conductors if required by the NEC or if called out on the drawings to do so. Switches shall be fusible type where indicated on the drawings.

#### 2.11 CABLE TIES

A. Provide cable ties in the length required. Standard, indoor cable ties shall be 7.9 inches in length minimum, 0.19 inches in width and 0.47 inches thick. The tensile strength shall be 50 pounds minimum and the maximum bundle diameter shall be 2 inches. Standard cable ties shall be black in color. Plenum rated cable ties shall be 6 inches in length minimum, .075 inches in width and 0.1 inches thick. The tensile strength shall be 50 pounds minimum and the maximum bundle diameter shall be 1.5 inches. Plenum rated cable ties shall be maroon in color.

# PART 3 - EXECUTION

#### 3.1 INSTALLATION

A. Install material in a first-class and workmanlike manner to the satisfaction of the Architect

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# SECTION 260518 - METAL CLAD CABLES

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specifications Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

#### 1.2 DESCRIPTION

A. Aluminum Metal clad cables may be utilized for branch circuit wiring in walls and above lay-in-tile ceilings only and installed in accordance with NEC 330.

### 1.3 REFERENCES

- A. Aluminum Metal clad cable shall be constructed in strict accordance with Underwriters Laboratories, Inc. Standard for Aluminum Metal Clad Cables, UL 1569. The cable shall bear the UL label and the manufacturer's "E" number.
- B. Further, the product shall have passed UL Test Procedure 1479, Through Penetration Fire Rating, and meet NEC 330.

# PART 2 - PRODUCTS

### 2.1 CONDUCTORS

- A. Provide electrical wires, cables, and connectors of manufacturer's standard materials, as indicated by published product information; designed and constructed as recommended by manufacturer for a complete installation and for application indicated. Except as otherwise indicated, provide copper conductors with conductivity of not less than 98% at 20°C (75°F).
- B. Wiring sizes #12 and #10 AWG shall be solid. Larger sizes may be stranded.
- C. All branch circuits and control wiring shall have color coded conductors to reflect the appropriate phase and voltage. Color coded identification bands shall be integral with the exterior armor sheath from the manufacturer for sizes #12, #10 and #8. If larger size cable in not available to meet these requirements, the conductors shall be identified per phase and voltage with a minimum of 3 wraps of ½" wide electrical tape. The cable sheath shall be color coded with bands of tape identifying each phase conductor per voltage and neutral conductor contained in the sheath. The sheathing shall be identified every 10', within 6" of any box, entering a wall cavity and 6" either side of passing through a wall.

### 2.2 FITTINGS

- A. Fittings shall be UL listed and identified for use with metal clad cable.
- B. Connectors shall be of steel or malleable iron and shall have saddle clamp to insure a tight termination of MC Cable to box.
- C. The cable end shall be cleanly cut with metal clad cable rotary cutting tool to ensure flush seating of the cable into the fitting. Fitting securement screws shall be properly torqued.
- D. Provide anti-short bushings in accordance with NEC
- E. The use of snap-in type connectors is not acceptable.

# PART 3 - EXECUTION

# 3.1 SPLICES

- A. Splicing connectors must have a metal spring that is free to expand. The spring must be suitably coated to resist corrosion. Each connector size must be listed by UL for the intended purpose. The connectors must be suitably color coded to assure that the proper size is used on the wire combinations to be spliced. Each connector must be capable of withstanding 105°C ambient temperatures. The connectors must be compatible with all common rubber and thermoplastic wire insulations. They must also be capable of making copper-to-copper, copper-to-aluminum, and aluminum-to-aluminum splices. At the Contractor's option, self-strapping electrical tap connectors may be used in wire size and voltage range of the connector. When tape is required for splices, SCOTCHBRAND No. 33, or approved equal, shall be used. Use plastic tape on PVC and its copolymers and rubber-based pressure-sensitive adhesive. The tape must be applicable at temperatures ranging from 0°F through 100°F without loss of physical or electrical properties. The tape must not crack, slip, or flag when exposed to various environments indoor or outdoor. The tape must also be compatible with all synthetic cable insulations as well as cable splicing compounds.
- B. MC Cable used to serve light switches shall be provided with a neutral conductor.
- C. Make splices in conductors #8 AWG and larger with solderless connectors, with molded composition covers.
- D. Connect conductors #12 and #10 AWG with pre-insulated spring connectors rated at not less than 105°C. Connectors shall be UL approved for fixture and pressure work. Connectors shall be 3M CO. SCOTCHLOK, Type Y, R, and B, or approved equal.
- E. Join or terminate conductors #8 AWG and larger with pressure-type copper connectors and properly tape.

# SPS INNOVATION CENTER Suffolk Public Schools

F. All branch circuit and control wiring shall be color coded. The color shall be integral with exterior armer sheath for sizes #12, #10, and #8 AWG. Larger size wire and cable shall be color coded with a minimum 1/2" wide, colored, plastic tape strip. Place strips a minimum of 6" on center anywhere the conductors are accessible and visible. Wire and exterior sheath shall be color coded to match the existing color coding if an existing color code is present. If there is no existing color code, provide the following:

120/208-Volt System	277/480-Volt System
Phase A - black	Phase A - brown
Phase B - red	Phase B - orange
Phase C - blue	Phase C - yellow
Neutral - white	Neutral - grey
Ground - green	Ground - green

G. Advise the Architect if the color coding provided by the utility company differs from that indicated above.

# 3.2 SUPPORT OF CABLE

- A. Where metal clad cables are exposed, run parallel with walls or structural elements. Vertical runs shall be plumb; horizontal runs level and parallel with structure, as appropriate. Groups shall be racked together neatly with both straight runs and bends parallel and uniformly spaced.
- B. Metal clad cables shall be securely fastened in place at intervals of not more than six feet, with suitable clamps or fasteners of approved type, and vertical runs shall be properly supported to present a secure installation. Cable ties used for supporting and securing MC cable, shall be listed, and identified for securement and support.
- C. Metal clad cable installed parallel to framing members, such as studs, joist, or rafters, shall be supported so that the nearest outside surface of the cable is not less than 1-1/4 inches from the nearest edge of the framing member. Where this distance cannot be maintained, the cable shall be protected by a steel plate, sleeve, or equivalent that is at least 1/16-inch thick.
- D. Maintain at least 6-inch clearance between metal clad cables and other piping systems. Maintain 12-inch clearance between metal clad cables and heat sources such as flues, steam pipes, and heating appliances.
- E. No metal clad cable shall be fastened to other conduits or pipes or installed to prevent the ready removal of other pipes or ducts for repairs.
- F. Individual metal clad cables hung from roof structure or structural ceiling shall be supported by split-ring hangers and wrought-iron hanger rods. Where three or more metal clad cables are suspended from the ceiling in parallel runs, use steel channels, Unistrut or equal, hung from 1/4-inch rods to support the cables. The cables on these channels shall be held in place with metal clad cable clamps designed for the particular channel that is used.

- G. Secure metal clad cable support racks to concrete walls and ceilings by means of cast-inplace anchors; die-cast, rustproof alloy expansion shields; or cast flush anchors. Wooden plugs, plastic inserts, or gunpowder driven inserts shall not be used as a base to secure <u>conduit</u> supports.
- H. Metal clad cable shall be supported immediately on each side of a bend and not more than 1 foot from an enclosure where a run of metal clad cable ends.
- I. Metal Clad Cable shall be sleeved with metal pipe when passing through all masonry walls, fire rated walls and horizontally through a gypsum wall. No more than three cables shall be contained in one metal sleeve. Sleeves through gypsum type walls shall be secured during rough-in.

# SECTION 260519 - CONDUCTORS

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

#### 1.2 SCOPE OF WORK

A. Feeder and branch circuit wiring shall conform to the requirements of the NEC, and shall meet all relevant ASTM specifications.

### PART 2 - PRODUCTS

### 2.1 CONDUCTORS

- A. Provide electrical wires, cables, and connectors of manufacturer's standard materials, as indicated by published product information; designed and constructed as recommended by manufacturer for a complete installation and for the application indicated. Provide copper conductors with a conductivity of not less than 98% at a temperature of 20°C (68°F).
- B. Provide factory-fabricated wires of sizes, ampacity ratings, and materials for applications and services indicated. Where not indicated, provide proper wire selection as determined by installer to comply with project's installation requirements, the NEC, and NEMA standards. Select from the following UL types those wires with construction features which fulfill project requirements:
  - 1. Type THWN or THHN: Max operating temperature not to exceed 90°C (194°F) (THHN) in dry locations, or 75°C (167°F) (THWN) in wet or dry locations. Insulation, flame-retardant, moisture- and heat-resistant, thermoplastic; outer covering, nylon jacket; conductor, annealed copper.
  - 2. Type XHHW: For dry and wet locations; max operating temperature 90°C (194°F) for dry locations, and 75°C (167°F) for wet locations. Insulation, flame-retardant, cross-linked synthetic polymer; conductor, annealed copper.
- C. Unless specified otherwise, power and lighting conductors shall be 600 volt, Type THWN/THHN, or XHHW.
- D. Where light fixtures require 90°C (194°F) conductors, provide only conductors with 90°C (194°F) insulation.

- E. Conductors shall be continuous from outlet to outlet with splices made only in pull boxes, junction boxes, and outlet boxes.
- F. Do not use wire smaller than #12 AWG for power or lighting wiring.
- G. Refer to other Division 26 specification sections for type and size of wiring for Class 1, 2, and 3 circuits (circuits under 120V).
- H. Wiring sizes #12 and #10 AWG shall be solid. Larger sizes may be stranded.
- I. Neutral conductors shall not be under sized.

### PART 3 - EXECUTION

# 3.1 SPLICES

- Splicing connectors must have a metal spring that is free to expand. The spring must be A. suitably coated to resist corrosion. Each connector size must be listed by UL for the intended purpose. The connectors must be suitably color coded to assure that the proper size is used on the wire combinations to be spliced. Each connector must be capable of withstanding 105°C ambient temperatures. The connectors must be compatible with all common rubber and thermoplastic wire insulations. They must also be capable of making copper-to-copper, copper-to-aluminum, and aluminum-to-aluminum splices. At the Contractor's option, self-strapping electrical tap connectors may be used in wire size and voltage range of the connector. When tape is required for splices, SCOTCHBRAND No. 33, or approved equal, shall be used. Use the plastic tape on PVC and its copolymers and rubber-based pressure-sensitive adhesive. The tape must be applicable at temperatures ranging from 0°F through 100°F without loss of physical or electrical properties. The tape must not crack, slip, or flag when exposed to various environments indoor or outdoor. The tape must also be compatible with all synthetic cable insulations as well as cable splicing compounds.
- B. Make splices in conductors #8 AWG and larger with solderless connectors, with molded composition covers.
- C. Connect conductor sizes #12 and #10 AWG with pre-insulated spring connectors rated at not less than 105°C. Connectors shall be UL approved for fixture and pressure work. Connectors shall be 3M CO. SCOTCHLOK, Type Y, R, and B, or approved equal.
- D. Join or terminate conductors #8 AWG and larger with pressure-type copper connectors and properly tape.
- E. All branch circuits, feeders, and control wiring or cables of any type shall be color coded to identify the voltage and phase. The color shall be integral with the Insulation for sizes #12, #10, and #8 AWG. Larger size wire and cable shall be color coded with a minimum 1/2" wide, colored, plastic tape strip. Place strips a minimum of 6" on center anywhere the conductors are accessible and visible. Wire and cable shall be color coded to match the

existing color coding if an existing color code is present. If there is no existing color code, provide the following:

120/208-Volt System	277/480-Volt System
Phase A - black	Phase A - brown
Phase B - red	Phase B - orange
Phase C - blue	Phase C - yellow
Neutral - white	Neutral - gray
Ground - green	Ground - green

- F. After all wiring is pulled and ready for operation but prior to placing systems in service, conduct insulation resistance tests in all feeder circuits. Measure the insulation resistance between conductors and between each conductor and ground. Make measurements with an instrument capable of making measurements at an applied potential of 500 Volts.
- G. Take readings after the voltage has been applied for a minimum of one minute. The minimum insulation resistance for circuits of #12 AWG conductors shall be 1,000,000 ohms. For circuits of #10 AWG or larger conductor, a resistance based on the allowable ampacity of the conductor shall be as follows:

25 through 50 Amperes	250,000 ohms
51 through 100 Amperes	100,000 ohms

- H. Submit the results of the insulation resistance tests to the Architect for approval. Provide readings for each circuit tested indicating the points between which the circuit was tested, reading, date and time of test, and name of the individual performing the test.
- I. Advise the Architect/Engineer in writing of the tests five (5) working days prior to the date the testing is to commence.
- J. Advise the Engineer if the color-coding provided by the utility company differs from that indicated above.

# 3.2 TEMPORARY WIRING

A. Temporary wiring is not specified nor governed by this Division of the Specifications.

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# SECTION 260525 - SURFACE METAL RACEWAY

#### PART 1 - GENERAL

#### 1.1 REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

#### 1.2 SCOPE

- A. The work covered under this Section shall include furnishing and installing surface mounted metal raceways complete for all electrical systems as shown on the Drawings and herein specified. Surface raceway systems shall consist of raceway bases, covers, appropriate fittings, dividers, and device mounting plates necessary for a complete installation.
- B. All material and equipment shall be new and of the quality noted or specified. Material, equipment, and work of inferior quality will be rejected and shall be removed from the job site immediately upon rejection and replaced. Unacceptable work shall be removed and replaced. All replacement material and work shall be done at the Contractor expense. The Architect will decide upon the quality of material and equipment furnished and of the work performed.

#### 1.3 QUALITY ASSURANCE

- A. All equipment, materials, and their installation shall conform to the requirements of the National Electrical Code (NEC), local code requirements, and these Specifications.
- B. All equipment and materials shall be listed by Underwriters Laboratories, Inc. (UL) for their intended use and shall bear the UL label.
- C. Equipment shall be constructed in accordance with National Electrical Manufacturer's Association (NEMA) standards.
- D. Submittals are required in accordance with Section 260100 of these Specifications.

# 1.4 USES PERMITTED

A. Surface mounted metal raceway shall be used where indicated on the drawings where new wiring is required on existing walls and on new walls as also indicated on the Drawings.

### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver raceway systems in factory labeled packages.
- B. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
- C. Protect from damage due to weather, excessive temperature, and construction operations.

# PART 2 - PRODUCTS

# 2.1 MANUFACTURERS

- A. Surface metal raceways shall be as manufactured by The Wiremold Company, as described herein as the basis of design, or equal products as manufactured by Hubbell Incorporated and Mono Systems.
- B. All components and fittings shall be of the same manufacturer, or UL listed as an assembly.

# 2.2 MATERIALS AND COMPONENTS

- A. All surface metal raceways shall be galvanized steel, unless otherwise indicated. Finish shall be white in color having a scratch- resistant surface (a polyester topcoat over a colored base) and shall be suitable for field repainting to match surroundings.
- B. A full complement of fittings must be available including but not limited to mounting clips and straps, couplings, flat, internal and external elbows, cover clips, tees, entrance fittings, wire clips, support clips, c-hangers, end caps, conduit connectors, bushings, and take-off fittings to adapt to flush wall boxes. The covers shall be painted with an enamel finish; colored to match the raceway. They shall overlap the raceway to hide uneven cuts. All fittings shall be supplied with a base where applicable to eliminate mitering. Transition fittings shall be available to adapt to other sizes and types of raceways of the same manufacturer. Provide all fittings, etc. for a complete installation.
- C. Device Boxes shall be suitable for the type of raceways provided and for mounting standard devices and faceplates. Device boxes shall be provided in single- and multiple-gang configurations, up to six-gang. Single-gang boxes shall allow for snap-on and fastener applications. They shall range in depth from 0.94" to 2.75". Extension boxes shall be provided to adapt to existing standard flush switch and receptacle boxes.
- D. The raceway manufacturer shall provide a complete line of connectivity outlets and modular inserts for UTP/STP, Fiber Optic, Coaxial and other cabling types with face plates and bezels to facilitate mounting. A complete line of preprinted station and port identification labels, snap-in icon buttons as well as write-on station identification labels shall be available. Provide as needed for a complete installation.

E. Raceways used for communications cabling shall have a complete line of full capacity corner elbows and tee fittings, and used where required or shown on the Drawings, to maintain a controlled 2" cable bend radius which meets the specifications for Fiber Optic and UTP/STP cabling and exceeds the TIA 569 requirements for communications pathways.

# 2.3 SURFACE METAL RACEWAYS

A. Wiremold Series 500 or 700 raceway shall be one-piece design with a base and cover factory assembled. The total width shall be 3/4" x 17/32" high with a capacity of 0.19 square inches for 500 or 3/4" x 21/32" with a capacity of 0.26 square inches for 700. The raceway base and cover shall be a minimum thickness of 0.040". The raceway shall be available in five (5) foot and ten (10) foot lengths.

# PART 3 - EXECUTION

# 3.1 EXAMINATION

A. Examine conditions under which surface raceways, boxes, distribution systems, accessories, and fittings are to be installed and substrate that will support raceways. Notify the Architect of conditions detrimental to proper completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected.

# 3.2 INSTALLATION

- A. Surface raceways shall be installed in strict compliance with the manufacturer's installation instructions and recommendations and approved shop drawings. Coordinate installation with adjacent work to ensure proper clearances and to prevent electrical hazards.
- B. Surface raceways shall be installed parallel with or at right angles to building structure and at the mounting heights noted on Drawings.
- C. Surface raceway systems shall be mechanically continuous and connected to all electrical outlets, boxes, device mounting brackets, and cabinets, in accordance with manufacturer's installation sheets.
- D. Metal raceways shall be electrically continuous and bonded in accordance with the National Electrical Code for proper grounding.
- E. Surface raceway shall be supported at intervals not exceeding five (5) feet or in accordance with manufacturer's installation sheets using appropriate anchors and screws. The use of drive pins and/or other methods using compressed air or gases are not acceptable.
- F. Provide accessories as required for a compete installation, including insulated bushings and inserts where required by the manufacturer.
- G. Close all unused raceway openings using manufacturer's recommended accessories.

- H. All surface raceway connections to outlet and/or junction boxes shall be made using adjustable offset connectors or combination connectors as detailed on the Drawings. The connectors shall be furnished by the manufacturer of the surface raceway.
- I. Field cutting of surface raceways base and covers shall be accomplished by the use of the manufacturer's raceway cutters specifically designed for this purpose.

# 3.3 CLEANING AND PROTECTION

- A. Clean exposed surfaces using non-abrasive materials and methods recommended by manufacturer.
- B. Protect raceways and boxes until final acceptance by the Owner.
- C. Repaint marred and scratched surfaces with touch-up paint to match original finish.

SECTION 260526 - GROUNDING

### PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

#### 1.2 SCOPE OF WORK

A. Provide grounding for conduits, motor frames, metal casings, receptacles, and solid neutral, and as required by NEC Article 250.

### PART 2 - PRODUCTS

#### 2.1 GROUND WIRE

A. Provide a green insulated ground wire, sized per the NEC, in all conduits, junction boxes, and pull boxes.

# PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Connect grounding conductors to the panelboard equipment ground bus and not to the panelboard neutral bus. Also connect grounding bushings to the ground bus. Connect the neutral bus only to the system neutral wire. Provide a bonding wire between the equipment ground bus and the neutral bus in the main distribution equipment only. The grounding system (conduit, cabinets, enclosures, and grounding conductors) and the grounded system (neutral conductors and service equipment ground) shall be separate and independent systems, except at the main distribution equipment.
- B. Test resistance to ground and submit readings to the Architect for review. Include the date and time of the test and the name of the individual performing the test.

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# SECTION 260529 - SUPPORTING DEVICES

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

#### 1.2 SCOPE OF WORK

- A. Extent of supports, anchors, sleeves, and seals is indicated in other Division 26 Sections.
- B. Types of supports, anchors, sleeves, and seals specified in this Section include the following:
  - C-clamps I-beam clamps One-hole conduit straps Two-hole conduit straps Round steel rods Expansion anchors Toggle bolts Wall and floor seals Minerallac Straps 2-Piece Strutt Straps Slotted Channel Cable Ties
- C. Supports, anchors, sleeves, and seals furnished as part of factory-fabricated equipment are specified as part of equipment assembly in other Division 26 Sections.

#### 1.3 QUALITY ASSURANCE

- A. Furnish supporting devices manufactured by firms regularly engaged in manufacture of supporting devices of types, sizes, and ratings required.
- B. Comply with the requirements of the NEC, as applicable to construction and installation of electrical supporting devices.
- C. Comply with applicable requirements of ANSI/NEMA FB1, "Fittings and Supports for Conduit and Cable Assemblies."

- D. Comply with NECA "Standard of Installation" pertaining to anchors, fasteners, hangers, supports, and equipment mounting.
- E. Provide electrical components which are UL-Listed and labeled.

# PART 2 - PRODUCTS

# 2.1 MANUFACTURED SUPPORTING DEVICES

- A. Provide supporting devices complying with manufacturer's standard materials, design, and construction in accordance with published product information and as required for a complete installation, and as herein specified. Where more than one type of device meets indicated requirements, selection is installer's option.
- B. Provide supporting devices of types, sizes, and materials required, and having the following construction features:
  - 1. Reducing Couplings: Steel rod reducing coupling, 1/2" by 5/8"; galvanized steel; approx. 16 pounds per 100 units.
  - 2. C-Clamps: Galvanized steel; 1/2" rod size; approx. 70 pounds per 100 units.
  - 3. I-Beam Clamps: Galvanized steel, 1-1/4" by 3/16" stock; 3/8" cross bolt; flange width 2"; approx. 52 pounds per 100 units.
  - 4. One-hole Conduit Straps: For supporting metal conduit through 3/4" galvanized steel; approx. 7 pounds per 100 units.
  - 5. Two-hole Conduit Straps: For supporting metal conduit above 3/4" galvanized steel; 3/4" strap width; and 2-1/8" between center of screw holes.
  - 6. Hexagon Nuts: For 1/2" rod size; galvanized steel; approx. 4 pounds per 100 units.
  - 7. Round Steel Rod: Galvanized steel; 1/4" dia.; approx. 12.2 pounds per 100 feet, 3/8" dia.; approx. 29.3 pounds per 100 feet, 1/2" dia.; approx. 67 pounds per 100 feet.
  - 8. Offset Conduit Clamps: For supporting 2" rigid metal conduit; galvanized steel; approx. 200 pounds per 100 units.
  - 9. 2-Piece strut strap, appropriate size, and type for type of conduit being installed. 1piece straps are prohibited.
  - 10. Minerallac straps sized appropriately for the conduit installed. Drilling out the attachment hole is prohibited. Use proper size hardware for attachment per the UL listing.
  - 11. 7/8" and 1-3/4" slotted channel shall be sized appropriately per the manufacturer's specifications for weight distribution. All feeder conduit racks shall be 1-3/4" minimum.
  - 12. Cable ties shall be Type 2S and 21S. Install in accordance with Section 330.30(A) of the NEC.
- C. Provide anchors of types, sizes, and materials required and having the following construction features:
  - 1. Expansion Anchors: 1/2"; approx. 38 pounds per 100 units.
  - 2. Toggle Bolts: Springhead; 3/16" by 4"; approx. 5 pounds per 100 units.

- 3. Concrete Anchors: Anchors used for attaching 1/4" rod shall be Hangermate onepiece.
- 4. Concrete screw with internal threads or equal. Follow manufacturers installation specifications for proper installation.
- 5. Concrete Anchors: Anchors used for attaching 3/8" and 1/2" rod shall Lok Bolt Sleeve anchor type Dewalt 05815S-PWR and 05825S-PWR or approved equal. Follow manufacturers technical Data for weight limitations and installation specifications for proper installation.
- 6. Drop-in type anchors shall be used only in vertical concrete walls. Hollow wall anchors shall be used in hollow CMU walls. Anchor shall be installed with manufacturer approved set tool.
- D. Provide sleeves and seals of types, sizes, and materials required, and having the following construction features:
  - 1. Provide factory-assembled, watertight wall and floor seals suitable for sealing around conduit, pipe or tubing passing through concrete floors and concrete block walls. Construct with steel sleeves, malleable-iron body, neoprene sealing grommets and rings, metal pressure rings, pressure clamps and cap screws.
- E. Provide U-channel strut system for supporting electrical equipment, 16-gauge hot-dip galvanized steel of sizes required; construct with 9/16" dia. holes, 8" o.c. on top surface, and with the following fittings which mate and match with U-channel:
  - Fixture hangers Channel hangers End caps Beam clamps Wiring stud Rigid conduit clamps Conduit hangers U-bolts

# PART 3 - EXECUTION

# 3.1 INSTALLATION OF SUPPORTING DEVICES

- A. Install hangers, anchors, sleeves, and seals as indicated in accordance with manufacturer's published instructions and with recognized industry practices to ensure supporting devices comply with the requirements of the NEC, NECA, and ANSI/NEMA for installation of supporting devices.
- B. Coordinate with other electrical work, including outlet box, raceway and wiring work, as necessary to interface installation of supporting devices with other work.
- C. Install hangers, supports, clamps, and attachments to support conduit and outlet boxes properly from building structure. Arrange for grouping of parallel runs of horizontal

conduits to be supported together on trapeze-type hangers where possible. Install supports with maximum spacings indicated.

D. Tighten sleeve seal nuts until sealing grommets have expanded to form watertight seal.

# SECTION 262420 - MOTORS AND CONTROLS

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

#### 1.2 SCOPE OF WORK

- A. Furnish and install disconnect switches as indicated on the drawings and specified herein.
- B. Provide all power wiring, disconnect switches and electrical connections to all equipment provided and requiring electrical connections. Starters and/or magnetic contactors; for HVAC equipment that is not integral with the HVAC equipment; shall be furnished by Division 23 Contractor, installed where and as indicated on the electrical drawings by the Electrical Contractor and provided with power wiring by the Electrical Contractor unless otherwise indicated. Power wiring between magnetic contactors and the final connection point on the HVAC equipment shall be provided under Division 26. Division 23 Contractor shall provide the proper number and size of auxiliary contacts in the magnetic contactors required for the proper operation and control of the HVAC equipment.
- C. All control wiring and conduits between control instruments and the magnetic contactor serving a piece of mechanical equipment shall be provided by Division 23 Contractor and installed in accordance with the requirements of Division 26, unless otherwise indicated on the electrical drawings or in the electrical specifications.
- D. Review the mechanical drawings and specification sections for exhaust fans requiring control by wall switch, solid state speed controller, or line voltage thermostat and provide same where indicated on the electrical drawings.

#### PART 2 - PRODUCTS

#### 2.1 DISCONNECT SWITCHES

- A. Disconnect switches shall be rated for the voltage of the equipment being served with number of poles and current rating as indicated. Disconnect switches shall be non-fusible or fusible type as indicated on the drawings.
- B. Switches shall be NEMA standard Heavy Duty type.
- C. Switches shall be horsepower rated when used for motor disconnect means.

D. Provide fused disconnect switches complete with appropriately sized fuses for the circuits controlled.

#### 2.2 MOTOR RATED SWITCHES

- A. Motor rated switches shall be rated for the voltage of the equipment being served with number of poles and current rating as indicated.
- B. Motor rated switches shall be UL listed, suitable as motor disconnect, and industrial grade.
- C. Motor-rated switches shall be horsepower rated when used for motor disconnect means.

# PART 3 - EXECUTION

### 3.1 INSTALLATION OF DISCONNECT SWITCHES

- A. Examine area and conditions under which electrical connections for equipment are to be installed. Notify the General Contractor; in writing; of conditions detrimental to proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.
- B. Coordinate locations of disconnect switches with the locations of mechanical equipment, piping, electrical equipment and any and all other building elements such that all NEC requirements, including working clearances, are met. Adjust locations from those shown on the drawings as required to comply with NEC working clearance requirements at no additional cost to the project.
- C. Secure disconnects switches to building elements or equipment housings where indicated on the drawings. Where building walls or equipment housings do not provide suitable mounting surfaces, provide a galvanized unistrut frame or rack satisfactory in size to securely support the disconnect switch, magnetic contactor and /or VFD. Where racks are required to be roof mounted, secure the rack to the roof in a method that does not compromise the roof membrane in any way. Submit the roof attachment method to the Architect/Owner for approval prior to construction or installation.

# 3.2 ELECTRICAL CONNECTIONS TO EQUIPMENT

- A. Provide electrical connections to equipment indicated in accordance with equipment manufacturer's published instructions and recognized industry practices. Comply with applicable requirements of UL, the NEC and the NECA "Standard of Installation," to ensure that products fulfill requirements.
- B. Coordinate with other work, including wires/cables, raceway and equipment installation as necessary to properly interface installation of electrical connections to equipment with other work.
- C. Connect electrical power supply conductors to equipment in accordance with equipment manufacturer's published instructions and wiring diagrams. Mate and match conductors of electrical connections for proper interface between electrical power supplies and installed equipment.
- D. The contractor shall coordinate the following electrical requirements for all mechanical equipment with the Division 23 Contractor:
  - 1. Number of electrical connections.
  - 2. Number and size of feeders' terminal lugs.
  - 3. Maximum overcurrent protection.
  - 4. Size and type of fuses.
- E. Cover splices with electrical insulating material equivalent to or greater than the electrical insulation rating of the conductors being spliced.
- F. Prepare cables and wires by cutting and stripping covering, armor, jacket, and insulation properly to ensure uniform and neat appearance where cables and wires are terminated. Exercise care to avoid cutting through tapes which will remain on conductors. Avoid "ringing" conductors while skinning wire.
- G. Trim cables and wires as short as practicable and arrange routing to facilitate inspection, testing and maintenance.
- H. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Accomplish tightening by utilizing proper torquing tools, including torque screwdriver, beam-type torque wrench, and ratchet wrench with adjustable torque settings. Where manufacturer's torquing requirements are not available, tighten connectors and terminals to comply with torquing values contained in UL 486A.
- I. Provide flexible steel conduit for motor connections and other electrical equipment connections where subject to movement and vibration.
- J. Provide liquid-tight flexible steel conduit for connection of motors and other electrical equipment where subject to movement and vibration and where connections are located where subject to any of the following conditions:
  - 1. All exterior locations
  - 2. Moist or humid atmosphere where condensation can be expected to accumulate (Example: sump pump and elevator pits)
  - 3. Corrosive atmosphere (Example: battery charging rooms)
  - 4. Water spray
  - 5. Dripping oil, grease, or water
  - 6. Kitchens and Sculleries

# 3.3 FIELD QUALITY CONTROL

A. Upon completion of installation of electrical connections and after circuitry has been energized with rated power source, test connections to demonstrate capability and compliance with requirements. Ensure that direction of rotation of each motor fulfills requirement. Correct malfunctioning units at site, then retest to demonstrate compliance.

## SECTION 262726 - WIRING DEVICES AND DEVICE PLATES

### PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

#### 1.2 SCOPE OF WORK

- A. The extent of wiring device work is indicated by drawings and schedules. Wiring devices are defined as single discrete units of the electrical distribution systems which are intended to carry but not utilize electric energy.
- B. Types of electrical wiring devices in this Section include the following:

Receptacles Ground-fault circuit interrupters Cover plates Wall Plate-type Dimmer Switches

- C. Comply with the requirements of the NEC, as applicable to installation and wiring of electrical wiring devices.
- D. Comply with applicable requirements of UL 20, 486A, 498, 943, and 1472 pertaining to installation of wiring devices. Provide wiring devices which are UL-Listed and labeled.
- E. Comply with applicable portions of NEMA WD1, "General-purpose Wiring Devices, and WD5, "Wiring Devices, Specific Purposes."

### PART 2 - PRODUCTS

## 2.1 FABRICATED WIRING DEVICES

A. Provide factory-fabricated wiring devices in types and electrical ratings for applications indicated and which comply with NEMA WD1. Provide white colored-devices.

### 2.2 RECEPTACLES

A. Duplex: Provide Industrial/Institutional, Specification-Grade, Tamper Resistant TR duplex receptacles, 2-pole, 3-wire, grounding, with green hexagonal equipment ground screw,

# WIRING DEVICES AND DEVICE PLATES

single-piece brass mounting yoke with integral ground terminals, 20 amperes, 125 Volts, with metal plaster ears; designed for side and back wiring, with NEMA configuration 5-20R, unless otherwise indicated. LEVITON 5362, Tamper Resistant TR Series, or approved equal.

- B. Ground-fault Circuit Interrupters: Provide Industrial/Institutional, Specification-Grade, Tamper Resistant TR, "feed-thru"-type ground-fault circuit interrupters, with heavy-duty duplex receptacles, capable of being installed in a 2-3/4" deep outlet box without adapter, grounding type UL-rated Class A, Group 1, rated 20 amperes, 120 Volts, 60 Hz; with solidstate ground-fault sensing and signaling; with 5 mA ground-fault trip level; equipped with NEMA configuration 5-20R. LEVITON model 7899, Tamper Resistant TR Series, or approved equal.
- C. Ground-fault Weather Resistant Circuit Interrupters; Provide Industrial/Institutional, Specification-Grade, Tamper Resistant TR, "feed-thru"-type ground-fault circuit interrupters, with heavy-duty duplex receptacles, capable of being installed in a 2-3/4" deep outlet box without adapter, grounding type UL-rated Class A, Group 1, rated 20 amperes, 125 Volts, 60 Hz; with solid-state ground-fault sensing and signaling; with 5 mA groundfault trip level; equipped with NEMA configuration 5-20R. LEVITON model WR899-W, Tamper Resistant TR or approved equal.

# 2.3 SWITCHES

A. LED Dimmers: Provide 120/277 volts AC, 60Hz, Single pole and 3-Way, 0-10VDC, LED power Supply Dimmer controls for LED light fixtures; wattage as indicated, with continuously adjustable slide dimmer, ON/OFF button, and equipped with electromagnetic filters to eliminate noise, RF and TV interference.

# 2.4 WIRING DEVICE ACCESSORIES

- A. Cover plates: Provide mid-size (JR Jumbo) stainless steel cover plates for single and combination wiring devices of types and with ganging and cutouts as required. Provide metal screws for securing plates to devices; screw heads colored to match color of plates. Provide stainless-steel cover plates in mechanical and electrical equipment rooms. Provide all receptacles connected to emergency circuits with red color coverplates. Red color coverplates shall be type 302, labeled with 1.8" high engraved, and filled lettering "Emergency".
- B. Provide "metal extra duty weatherproof-while-in-use" rated cover plates for receptacles installed outdoors where exposed to weather.

# PART 3 - EXECUTION

# 3.1 INSTALLATION OF WIRING DEVICES

A. Install wiring devices where indicated in Contract Documents in accordance with

# WIRING DEVICES AND DEVICE PLATES

manufacturer's published instructions, applicable requirements of the NEC and NECA "Standard of Installation," and in accordance with recognized industry practices to fulfill project requirements.

- B. Coordinate with other work, including painting, electrical boxes and wiring work, as necessary to interface installation of wiring devices with other work.
- C. Install wiring devices only in electrical boxes which are clean, free from building materials, dirt, and debris.
- D. Install wiring devices after wiring work is completed.
- E. Install cover plates after painting work is completed. Label the inside face of each cover plate with indelible black marker indicating the number of each circuit contained in or running through the outlet box.
- F. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for wiring devices. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A and UL 486B. Use properly scaled torque indicating hand tool.
- G. Terminate all switch and receptacle wiring on side screw terminals. Back terminations are not permitted.
- H. Install all switches and receptacles with sufficient wiring length such that the device may be extracted from the outlet box a minimum of 6" while still connected.
- I. Install grounded conductors at the location of switches per the requirements of NEC Article 404.
- J. Switches that are combined in the same enclosure that exceed 300 volts are prohibited.
- K. Receptacle that are used during construction after permanent power is energized shall be replaced at the final completion of the project.

# 3.2 PROTECTION OF COVER PLATES AND RECEPTACLES

A. Upon installation of cover plates and receptacles, take caution regarding use of convenience outlets. At time of Substantial Completion, replace all cover plates and receptacles which have been damaged; during the execution of this project; including those painted over, burned, or scored by faulty plugs.

#### 3.3 GROUNDING

A. Provide equipment grounding connections for wiring devices, unless otherwise indicated. Tighten connections to comply with tightening torques specified in UL 486A to assure permanent and effective grounding.

# 3.4 TESTING

A. Prior to energizing circuitry, test wiring for electrical continuity and for short-circuits. Ensure proper polarity of connections is maintained. Subsequent to energization, test wiring devices to demonstrate compliance with requirements. The proper outlet testing equipment shall be used to test receptacles.

# SECTION 265100 - INTERIOR BUILDING LIGHTING

### PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

#### 1.2 DEFINITIONS

BF:	Driver factor.
CCT:	Correlated color temperature
CRI:	Color-rendering index.
CU:	Coefficient of utilization.
RCR:	Room cavity ratio.
L70:	Minimum 70% maintained initial-rated lumens at average rated life for
	LEDs.
IESNA:	Illuminating Engineering Society of North America
LM-80:	IESNA approved method of measuring Lumen Depreciation of LED Light
	Sources
LED:	Light Emitting Diode
UL:	Underwriter Laboratories

#### 1.3 SCOPE OF WORK

- A. Extent of interior light fixture work is indicated by drawings and schedules.
- B. Light fixtures shown installed on exterior walls or under canopies attached to the building are considered interior building lighting.
- C. Types of interior light fixtures in this Section include the following:

Light-emitting Diode

### 1.4 QUALITY ASSURANCE

- A. Comply with the requirements of the NEC, as applicable to installation and construction of interior building light fixtures.
- B. Provide interior light fixtures which are UL-Listed and labeled.

C. Provide LED drivers which comply with NEMA SSL-1, "Electronic Drivers for LED Devices, Arrays, or Systems", and SSL-3, "High Power White LED Binning for General Illumination".

## PART 2 - PRODUCTS

## 2.1 INTERIOR LIGHT FIXTURES

- A. Provide light fixtures of sizes, types, and ratings indicated; complete with, but not limited to, housings, reflectors, LED module, LED drivers and wiring. Provide fixture trims as required for proper installation into the type ceiling in which installed. Review Architectural reflected ceiling plans for ceiling types and construction and provide all mounting hardware required for proper installation of the fixtures specified for the location.
- B. Air-Handling Fixtures: Fixtures used as air-handling registers shall meet requirements of NFPA.

## 2.2 LED LIGHT FIXTURES

- A. LED fixtures shall be in compliance with UL.
- B. Interior Area LED Fixtures:
  - 1. Kelvin temperature of interior fixtures as indicated on drawings.
  - 2. Minimum of 75 plus lumens per watt.
  - 3. CRI 80 or greater.
  - 4. 5-year warranty minimum with L70 of 50,000 hours or greater.
  - 5. Modular design for field replacement of parts.
  - 6. Tool less access to driver and LED modules.
  - 7. Cannot have LED pixilation (or commonly called bug eye effect).
  - 8. UL certified up to 90F degrees operating temperature.
- C. Manufactured by one of the following:
  - 1. Nichia Corporation.
  - 2. Cree, Inc.
  - 3. Philips LumiLED.
  - 4. Osram Opto Semiconductors.
  - 5. Cooper Industries.
  - 6. Lusio Lighting.
  - 7. Sony.
  - 8. Citizens Electronics

# 2.3 RECESS- AND FLUSH-MOUNTED FIXTURES

A. Provide light fixture types which can be relamped from the bottom. Access to driver shall

# INTERIOR BUILDING LIGHTING

be from the bottom. Trim for the exposed surface of flush-mounted fixtures shall be as required for the ceiling construction in which it is installed.

# 2.4 SUSPENDED FIXTURES

A. Provide hangers capable of supporting twice the weight of the fixture supported by the hanger. Hangers shall allow fixtures to swing within an angle of 20 degrees. Multiple-unit or continuous row fixtures shall have a tubing or stem for wiring at one point and a tubing or rod suspension provided for each unit length of chassis, including one at each end, unless indicated otherwise. Rods shall be a minimum 1/4" diameter.

# 2.5 EXIT LIGHTS

- A. Exit lights shall be in conformance with UL and NFPA. Exit lights shall be self-powered type.
- B. Self-Powered LED-Type Exit lights (Battery Backup): Provide with automatic power failure device, test switch, pilot light and fully automatic high/low trickle charger in a self-contained power pack. Battery shall be sealed electrolyte type, shall operate unattended, and require no maintenance, including no additional water, for a period of not less than 5 years. LED exit lights shall have emergency run time of 1.5 hours (90 minutes) minimum.

# 2.6 EMERGENCY LIGHTING EQUIPMENT

A. LED Emergency Driver: Each unit shall consist of an automatic power failure device, test switch operable from outside of the fixture, pilot light visible from outside the fixture, and fully automatic solid-state charger in a self-contained power pack. Charger shall be either trickle, float, constant-current or constant-potential type, or a combination of these. Battery shall be sealed electrolyte type with capacity as required to supply power to two LED circuit boards for 90 minutes at a minimum of 800 lumens output power. Battery shall operate unattended and require no maintenance for a period of not less than 5 years.

# PART 3 - EXECUTION

# 3.1 INSTALLATION

- A. Install interior light fixtures at locations and heights as indicated in accordance with fixture manufacturer's published instructions, applicable requirements of the NEC, NECA "Standard of Installation," NEMA standards, and with recognized industry practices to ensure that light fixtures fulfill requirements.
- B. Coordinate with all other work on this Contract as appropriate to properly interface installation of interior light fixtures.
- C. Fasten fixtures securely to building structural members, and check to ensure that solid pendant fixtures are plumb. Recessed fixtures shall be supported with individual annealed,

light zinc-coated finish, 12-gauge wire from all four corners tied to building structural members. Securing safety wires to bridging is not acceptable. The supporting wires shall be distinguishable by color or tagging.

- D. Clean interior light fixtures of dirt and debris (including lenses) upon completion of installation.
- E. Protect installed fixtures from damage during entire construction period.

# 3.2 FIELD QUALITY CONTROL

- A. Upon completion of installation of interior light fixtures and after building circuitry has been energized, apply electrical energy to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting.
- B. At the time of Substantial Completion, replace lamps in interior light fixtures which are observed to be noticeably dimmed after Contractor's use and testing, as judged by the Architect.

## 3.3 GROUNDING

A. Provide tight equipment grounding connections for each interior light fixture installation.

# SECTION 271500 - DATA/COMMUNICATION SYSTEMS CABLING

# PART 1 - GENERAL

# 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Section 260100, "Electrical General Provisions," apply to this Section.

## 1.2 DESCRIPTION OF WORK

- A. It is the purpose of this Specification to require the furnishing of the highest quality materials, equipment, and workmanship available, to fulfill the requirements of the work specified herein.
- B. The Data and Telephone Distribution System shall provide Category 6 (CAT 6) UTP, plenum-rated Cabling Infrastructure and plenum-rated.
- C. Work Included:
  - 1. Provide all labor, equipment, supplies, materials, and incidentals and all operations necessary for the "TURNKEY," fully tested, and completed installation of a Data and Telephone Distribution System, in complete accordance with the Contract Documents.
  - 2. The work shall include, but not be limited to, the following:
    - a. Coordination of the Raceway installation
    - b. Furnish Special Backboxes, as indicated on the drawings, for installation under Division 26
    - c. Furnish and install all Racks and Enclosures
    - d. Furnish, install, test, and certify the Data and Telephone Distribution Cable System

### 1.3 PERMITS AND INSPECTIONS

A. Obtain and pay for all permits and inspections required by all legal authorities and agencies having jurisdiction for the work. These permits or inspections shall be a part of the work of the Contractor performing the work.

## 1.4 SUBMITTALS

- A. Submit the following Shop Drawings and Submittals, per the schedule listed below for review by the Architect:
  - 1. Prior to proceeding with the work:
    - a. A complete schedule of ALL equipment and materials shall be furnished for the work. Accompanying the schedule shall be manufacturer's specification or data sheets for all major components listed in PART 2 of this Specification.
    - b. Shop Drawings: Complete shop drawings for all systems and assemblies specified. Each drawing shall have a descriptive title and all subparts of each drawing shall be labeled. All drawings shall have the name and location of the project and the installing contractor's name in the title block. Data and Telephone Distribution System shop drawings shall not be combined with any other auxiliary system shop drawings.
    - c. Cabinets & Assemblies: Complete CAD-generated scaled drawings of all equipment racks and assemblies. Each drawing shall show all equipment with its manufacturer and model number.
    - d. Device Locations: Complete CAD-generated scaled building drawings detailing installation locations of all data and telephone ports, IDF and MDF closets, equipment racks, etc. All conduit with cable quantities and types shall also be indicated.
    - e. Device Layout: Complete CAD-generated scaled drawings detailing all data and telephone plates, and custom components to be fabricated by the Contractor. Include the same details for all custom or non-standard components to be furnished by vendor/manufacturers of the Contractor. Show all connectors, mounting devices and engraving, and other labeling detail on these drawings.
    - f. Contractor job references and key employee résumés, as described in the Contractor Qualifications portion of this Specification.
    - g. Qualification Statements of any proposed subcontractors to meet the requirements in the Contractor Qualifications portion of this Specification.
    - h. Contractor certificates as described in Paragraph 2.1 of this Specification.
  - 2. Prior to proceeding with respective portions of work:
    - a. Details and descriptions of any other aspect of the system which differ from the contract drawings due to field conditions or due to the equipment furnished.
    - b. Submittal as otherwise noted on the drawings and/or as noted herein.
    - c. Approved shop drawings and instruction brochures, including schematic diagrams for all electronic devices, shall be present at the job site during the period set aside for system testing.
  - 3. At Project Completion:
    - a. Notebooks of operating instructions shall be prepared for the Owner as described herein.

- b. Record drawings: Prior to Final Acceptance, provide three complete sets of drawings showing all cable numbers and construction details in accordance with the actual system installation. Revise all shop drawings to represent actual installation conditions.
- c. Operation and Maintenance Manuals: Prior to Final Acceptance, provide three complete sets of Operation and Maintenance Manuals for the system. The Operation Manual shall contain all instruction necessary for the proper operation of the installed system and manufacturers' instruction. The Maintenance Manual shall contain all "proof of performance" information as required in PART 3, and all manufacturers' maintenance information.

# 1.5 DEFINITION OF TERMS

- A. The term "Contractor" shall refer to the person, persons, or company who or which actually contracts to perform the Data and Telephone Distribution System work specified herein.
- B. The term "data port" and "telephone port" shall refer to the location where CAT 6 cables are connected. All data and telephone ports are to be fully activated with complete network accessibility without the need to alter any cable configurations anywhere on the network.

# 1.6 CONTRACTOR QUALIFICATIONS

- A. The Contractor must be a contractor who has been regularly engaged in the furnishing and installation of data and telephone communications systems for a period of at least the last three (3) years and who can show evidence of successfully completing, with its present staff, at least three (3) projects of similar size and scope. The Contractor, not its employees, must meet these Contractor qualifications. With the submittal, provide a list of jobs completed, with contact, address and phone number of the Owner, and the Contractor's key employees assigned to the project, listing their responsibilities during the job and the length of time with the Contractor in this capacity.
- B. The Contractor shall demonstrate to the satisfaction of the Architect/Engineer and Owner that it has:
  - 1. Adequate plant and equipment to pursue the work properly and expeditiously.
  - 2. Adequate staff and technical experience to implement the work.
  - 3. Technically capable and factory trained service personnel at a Contractor-owned service facility within fifty (50) miles radius of the project site, to provide routine and emergency service for all products used in the project.
- C. The Contractor shall:
  - 1. Be bondable.
  - 2. Hold a Class A Contractor's License which is accepted as valid within the State of Virginia.
- D. Any contractor, who intends to bid on this work and does not meet the requirements of the "Contractor Qualifications" paragraph(s) above, shall employ the services of a Contractor

who does meet the requirements and who shall furnish the equipment, shop fabricate the equipment racks and subassemblies, make all connections to equipment and equipment racks, make all connections to patch panels and plates, test the completed system, and continuously supervise the installation and connections of all system cable and equipment.

E. A subcontractor so employed shall be acceptable to the Architect/Engineer and Owner and shall be identified in the submittal.

# 1.7 QUALITY ASSURANCE

- A. General: All equipment and materials required for installation under these Specifications shall be new (less than 1 year from date of manufacture) and without blemish or defect.
- B. Specific: Each major component of equipment shall have the manufacturer's name, address, and model number on a plate securely affixed in a conspicuous place. NEMA code ratings, UL label, or other data which is die-stamped into the surface of the equipment shall be easily visible.
- C. Substitutions:
  - 1. Where a specific piece of equipment has been discontinued and/or replaced by a new model, submission of the new model does not guarantee acceptance. Substitute items shall require evaluation by the Architect/Engineer, Owner or their agent prior to acceptance.
  - 2. If substitute equipment is allowed even by an approved submittal, the Contractor shall be completely responsible for its use and for its ability to fulfill all intended functions in the completed systems. The Contractor shall replace all such equipment with equipment listed by type and model number in the Specifications if there is any evidence of equipment instability and/or incompatibility.
  - 3. Any use of substitute equipment shall be at no extra cost to the Owner.

# PART 2 - PRODUCTS

# 2.1 SINGLE SOURCE RESPONSIBILITY

A. Except where specifically noted otherwise, all equipment supplied for the Data and Telephone Distribution System shall be the standard product of a single manufacturer of known reputation and experience in the industry. The Contractor shall have attended the manufacturer's installation and service schools. Certificates of this training shall be provided with the Contractor's submittal.

# 2.2 DATA AND TELEPHONE INFRASTRUCTURE

A. Twisted Pair Data and Telephone Cable:

- 1. Data and telephone cabling shall be four pair, unshielded twisted pair (UTP), plenum rated, and shall meet TIA/EIA-568.B.2.1 standards for CAT 6. The following specifications shall apply:
  - a. Conductors: #23 AWG solid copper, 4 pair;
  - b. Impedance: 100 ohms  $\pm 15\%$  at 1-100 MHz;
  - c. Mutual Capacitance: 5.6 nF/100m nominal;
  - d. Attenuation (per 100 m):
    - 1) 2.0 dB at 1 MHz
    - 2) 3.8 dB at 4 MHz
    - 3) 6.0 dB at 10 MHz
    - 4) 7.6 dB at 16 MHz
    - 5) 8.5 dB at 20 MHz
    - 6) 15.4 dB at 62.5 MHz
    - 7) 19.8 dB at 100 MHz
    - 8) 29.0 dB at 200 MHz
    - 9) 32.8 dB at 250 MHz
- 2. In-field splicing of UTP cables shall not be permitted.
- 3. UTP cables shall not exceed 90 meters from the data outlet port to the appropriate IDF patch panel.
- 4. National Electrical Code, Article 800, Type CMP specification shall be considered when UTP cables are installed, without benefit of adequate raceway, in a plenum air return.
- 5. All CAT 6 cables shall have blue jacket.
- B. Data/Telephone Outlets:
  - 1. Face Plates: Data/telephone outlets shall be provided as indicated on the drawings and meets the following specifications:
    - a. Single gang (unless otherwise noted), flush mountable, white color, plastic construction (unless otherwise noted);
    - b. Shall accept data/telephone and blank insert modules;
    - c. Shall have the capability to accept up to six individual ports;
    - d. Inserts shall snap in and out from the front of the data/telephone outlets;
    - e. Faceplate shall be supplied with pressure-sensitive icon labels.
- C. Staff Telephone Outlets:
  - 1. Face Plates: Telephone outlets shall be provided as indicated on the drawings and meets the following specifications:
    - a. Single gang (unless otherwise noted), flush mountable, white color, plastic construction (unless otherwise noted);
    - b. Shall accept telephone insert modules;
    - c. Telephone outlets shall be provided with coverplate suitable for mounting owner provided Cisco wall telephone handset. Coordinate coverplate type with the owner.

- D. Data and Telephone Inserts:
  - 1. Inserts for telephone outlets shall be RJ45 type, blue color and rated for CAT 6.
  - 2. Inserts for data outlets shall be RJ45 type, white color and rated for CAT 6.
  - 3. Blank port inserts shall be white color.
  - 4. Data Module Inserts shall meet the following minimum specifications:
    - a. RJ-45 type verified for CAT6 channel performance.
    - b. RJ-45 insert shall be configured to EIA-568A wiring standard.
    - c. Positive PS-ACR performance characteristics beyond 300 MHz.
    - d. Verified to meet IEEE 802.3ab specifications for Gigabit Ethernet.
    - e. 110 style IDC terminations for all four pairs for a UTP cable.
    - f. Available in multiple colors to meet the Owner's requirements.
- E. Certification:
  - 1. Contractor shall be factory certified to install the CAT 6 Cabling Infrastructure. The Contractor shall include a copy of the factory-provided certification with his submittal.
  - 2. The manufacturer of the passive, data, and telephone connectivity components shall warrant the passive components of the CAT 6 Cabling Infrastructure for a period of fifteen (15) years, if installed by its factory certified contractor.

# PART 3 - EXECUTION

#### 3.1 GENERAL

- A. Perform the work in accordance with acknowledged industry and professional standards and practices, and the procedures specified herein.
- B. Furnish and install all materials, devices, components, and equipment for complete operational systems.
- C. Maintain a competent supervisor and supporting technical personnel, acceptable to the Architect/Engineer during the entire installation. Change of the supervisor during the project shall not be acceptable without prior written approval from the Architect/Engineer.
- D. Coordinate all efforts with those of related trades. In the event of any conflicts, delayed or improper preparatory work by others, notify the Architect/Engineer. The Architect's/ Engineer's decision shall be binding. Verify all field conditions.

# 3.2 INSTALLATION OF SYSTEM

A. Device Locations: Locate all apparatus requiring adjustments, cleaning, or similar attention so that is shall be accessible for such attention. Equipment racks shall be positioned to permit full access for operation and service.

#### DATA/COMMUNICATION SYSTEMS CABLING

- B. Markings: Ports, cables, and cable terminations shall be logically and permanently marked. Hand-written tags will not be accepted.
- C. Conduit: The Contractor shall be responsible for reviewing and coordinating conduit installation for the system with the Division 26 Prime Contractor.

# 3.3 ELECTRICAL POWER

- A. Grounding: Review and coordinate electrical power system installation, including grounding, to ensure proper operation of the system.
- B. Verification: Verify that all AC power circuits designated for the system are properly wired, phased, and grounded.

# 3.4 CLEANING

A. Clean all junction and terminal box interiors thoroughly before installing plates, panels, or covers.

# 3.5 WIRING METHODS AND PRACTICES

- A. Identification: All wires shall be permanently identified at each wire end (origin and termination). Cover plates shall be mark with identification to. Wire and/or cover plate shall be marked with "E-Z" tape marker or equivalent. Label each cable in each destination (IDF/MDF) closet indicating the room from which it originates. Example: Cables from outlets in room A13 shall be labeled "A13-1", "A13-2", etc. The labels shall be affixed in such a manner as to be readily apparent to the Owner for three (3) years minimum. Labeling shall reflect final occupancy room designations, not construction room numbers.
- B. Splicing: Splicing of cables shall not be permitted between terminations at specified equipment.
- C. Pulling Cable: Do not pull wire or cable through any box fitting or enclosure where change of raceway alignment or direction occurs. Do not bend conductors to less than recommended radius. Employ temporary guides, sheaves, rollers, and other necessary items to protect cables from excess tension, abrasion, or damaging bending during installation.
- D. Cable Tie: Form in a neat and orderly manner all conductors in enclosures and boxes, wireways, and wiring troughs, providing circuit and conductor identification. Tie as required using plenum rated, T & B "Ty-Raps" (or equivalent) of appropriate size and type. Limit spacing between ties to 6" and provide circuit and conductor identification at least once in each enclosure.
- E. Wiring Harnesses:

- 1. All wires and cables entering equipment racks shall be formed into harnesses which are tied and supported in accordance with accepted Engineering practice.
- 2. Harnessed cables shall be formed in either a vertical or horizontal relationship to equipment, components, or terminations.

## 3.6 ACCEPTANCE TESTING

- A. All CAT 6 cables shall comply with and tested to EIA/TIA-568-B2.1 requirements.
- B. The Acceptance Testing shall be performed by the Owner or the Owner's agent. Coordinate this period so that free access, work lighting, and electrical power is available on the site.
- C. Be prepared to verify the performance of any portion of the system by demonstration and instrumented measurements.

## 3.7 SYSTEM DOCUMENTATION

- A. Prior to Final Acceptance Tests, submit to the Architect three (3) copies of an Operating and Maintenance Manual for the system that has been installed. These manuals shall be used during the Final Acceptance Testing of the system. Each manual shall contain the following information:
  - 1. Record drawings
  - 2. Operations and Maintenance Manuals
  - 3. Single line diagrams showing levels throughout system and impedances
  - 4. Provide test certification for CAT-6 at 350Mpbs. Provide one hard copy and one CD compatible with Microsoft Office Excel for these test results.

#### 3.8 WARRANTY

- A. The Contractor shall guarantee all components and labor of the work defined in this Specification for a period of one year after Final Acceptance by the Owner. The following conditions shall apply:
  - 1. The Contractor shall provide service within eight (8) hours, after notification by the Owner or his representative, within the hours of 8:00 a.m. to 5:00 p.m. from Monday through Friday. Service Request forms shall be supplied to the Owner and the faxing or mailing of such a request form shall constitute notification by the Owner of a service request.